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ABSTRACT

Following an explanation of the Level of Responsibility/Equitable Pay Function, its applicability is demonstrated to the analysis and to the design and redesign of organizational hierarchies. It is shown how certain common dysfuntional anomalies can be avoided by structuring an organization along the principles outlined. A technique is then developed for assessing the differential capabilities of incumbents for successfully discharging responsibilities at different levels of an organization; and for ensuring that the growth in their capacity to shoulder responsibility is continually taken into account. Examples are given of how the methods described have been used in managerial manpower planning, for preventing the loss of key managers, providing for management succession and filling vacancies from within and outside the organization. (Author)

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HUMAN FACTORS IN TECHNOLOGY RESEARCH GROUP

TECHNICAL REPORT*

ORGANIZATIONAL ANALYSIS AND CAREER PROJECTIONS BASED ON A LEVEL-OF-RESPONSIBILITY/EQUITABLE PAYMENT MODEL

HFT 72-8

by

Stephen Laner
with
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Berkeley, California 94720

May 1973

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Following an explanation of the Level of Responsibility/Equitable Pay Function, its applicability is demonstrated to the analysis and to the design and re-design of organizational hierarchies. It is shown how certain common dysfunctional anomalies can be avoided by structuring an organization along the principles outlined. A technique is then developed for assessing the differential capabilities of incumbents for successfully discharging responsibilities at different levels of an organization; and for ensuring that the growth in their capacity to shoulder responsibility is continually taken into account. Examples are given of how the methods described have been used in managerial manpower planning, for preventing the loss of key managers, providing for management succession and filling vacancies from within and outside the organization.

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INTRODUCTION

The data analyzed and discussed in this report fall somewhat outside the mainstream of the research under the above ONR contract. One of the chief objectives of that research was the evaluation and further development of Elliott Jaques' Timespan of Discretion method for measuring on a single yardstick the levels of work or responsibility in any employment position in any organization, large or small, private or public, civilian or military (Jaques, 1956, 1961, 1964). By comparison with even the highly sophisticated techniques of job evaluation now in widespread use, such a universally applicable method would obviously possess major advantages. Some of the magnitude of the impact it might be expected to have is conveyed by Jaques' assertion that:

> "Regardless of the actual wage or salary they might have been earning, regardless of type of occupation, regardless of position and regardless of income tax paid, individuals in jobs whose range of Level of Work as measured in Timespan, privately stated a very similar wage or salary bracket to be fair for the work they were doing." (Underline ours.)

A graphic representation of the relationship contained in this statement is the Level-of-Responsibility/Equitable Pay Function. As we hope to show in this report, this function can be put to a variety of uses of which the formulation of compensation structures ensuring equitable pay for the work or responsibility demanded in employment positions is only one. Beyond this, the function offers a powerful tool for the analysis of many live organizational issues: the distribution of responsibility up and down the vertical axis of executive hierarchies, the determination of the optimal number of levels in the hierarchies appropriate to different organizations, the dynamics of manpower planning, specification of the size of pay differentials and so on.

However, our adoption of the Level of Responsibility/Equitable Pay Function for purposes of this research should not be taken to imply a commitment to the TSD as a measure of responsibility. On the contrary, our experiences in applying this measure turned out to be disappointing, especially as regards inter-analyst and test-retest reliability. Accounts of attempts on the part of the project team to devise alternative measures of Level of Responsibility can be found in other reports. If we have nevertheless continued to employ the TSD here, this was done on the assumption that whatever the new yardstick developed, it will depend for its validity on the close correlation with Felt-Fair Pay* predicated by the Level of Responsibility/Equitable Pay Function.

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* We found that Felt-Fair Pay estimates are not as difficult to elicit as Jaques warns. Although our respondents were usually momentarily taken aback when asked to assign a fair dollar value to the demands of their jobs and spent some time thinking it over, they certainly did not reject the request as absurd or impossible to meet. The exception to this were young officers at the Naval Postgraduate School in Monterey who found it somewhat difficult to decide what their military jobs were worth in terms of civilian pay scales.

1. APPLICATIONS OF THE LEVEL-OF-RESPONSIBILITY/EQUITABLE PAY FUNCTION

1.1 Notes on the Level-of-Responsibility/Equitable Pay Function

Because Jaques constructed his version of the LR/EF function on the basis of Felt-Fair Pay estimates obtained in Britain and expressed in British currency, and because initially we had no estimates collected in the US, our first task was to translate his salary scale from pounds into US dollars (see Laner and Caplan, 1969). This could not be done simply by applying the prevailing official exchange rate. On the assumption that the distribution of earned income of the working population in the two countries would have similar shapes, we decided to derive a true conversion factor by defining the ratio of the respective average earnings for the years 1950 through 1968. For this we enjoyed the help and advice of the US Department of Commerce and the US Department of Labor. The ratio, termed Equitable Payment Conversion rate, lay generally close to 7.0*. By multiplying the British pound values on Jaques' Pay Scale by this rate, we obtained the dollar-graduated Pay Scale shown in Fig. 1. We have since found it unnecessary to revise it.

In order for the function to retain its timeliness, periodic updating is necessary to take account of wage and salary inflation. Since an index reflecting this inflation for the salaried US population as a whole is not, to our knowledge, being published, we used various sources to derive such an index and are currently updating it at quarterly intervals. The effect of the continuing wage and salary inflation are represented by the two parallel curves in Fig. 1; the lower series of dots shows the equitable incomes at consecutively higher levels of responsibility at the end of the last quarter of 1965, the continuous line above it, the corresponding equitable incomes at the end of the last quarter of 1970. Thus the equivalent 1970 salary in a position paying its incumbent some $8,000 in 1965 was nearly $11,000, the equivalent 1970 salary of a position paying $20,000 in 1965, just over $27,000.

Some important cautions must be adduced in relation to the preceding paragraph. In the first place the approximate 35% increase is not identical with overall inflation; it refers to the inflationary upward drift in wages and salaries only. Since the Second World War the rate of wage and salary inflation has, in fact, been more rapid than price inflation, in some years by as much as 50%. Next, the parallelism of the two curves in Fig. 1 is an artefact due to the logarithmic scaling of the abscissa. If a linear scale had been used, the two curves would start progressively diverging, the distance at the upper end being nearly 14 times as great as that at the lower end. Taken together, the two points made here generate the hypothesis that as the absolute level of real incomes rises, so too does the societal tolerance of greater income differentials. This seems to be borne out by the observation that in less affluent societies people tend to be more preoccupied with income equality than with equity in remuneration.

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* This means that for every pound sterling paid to an individual employed in Britain, the payment made to a US employee in a comparable position in any year from 1950 - 1968 was about $7.00, and not $2.80, the official exchange rate.

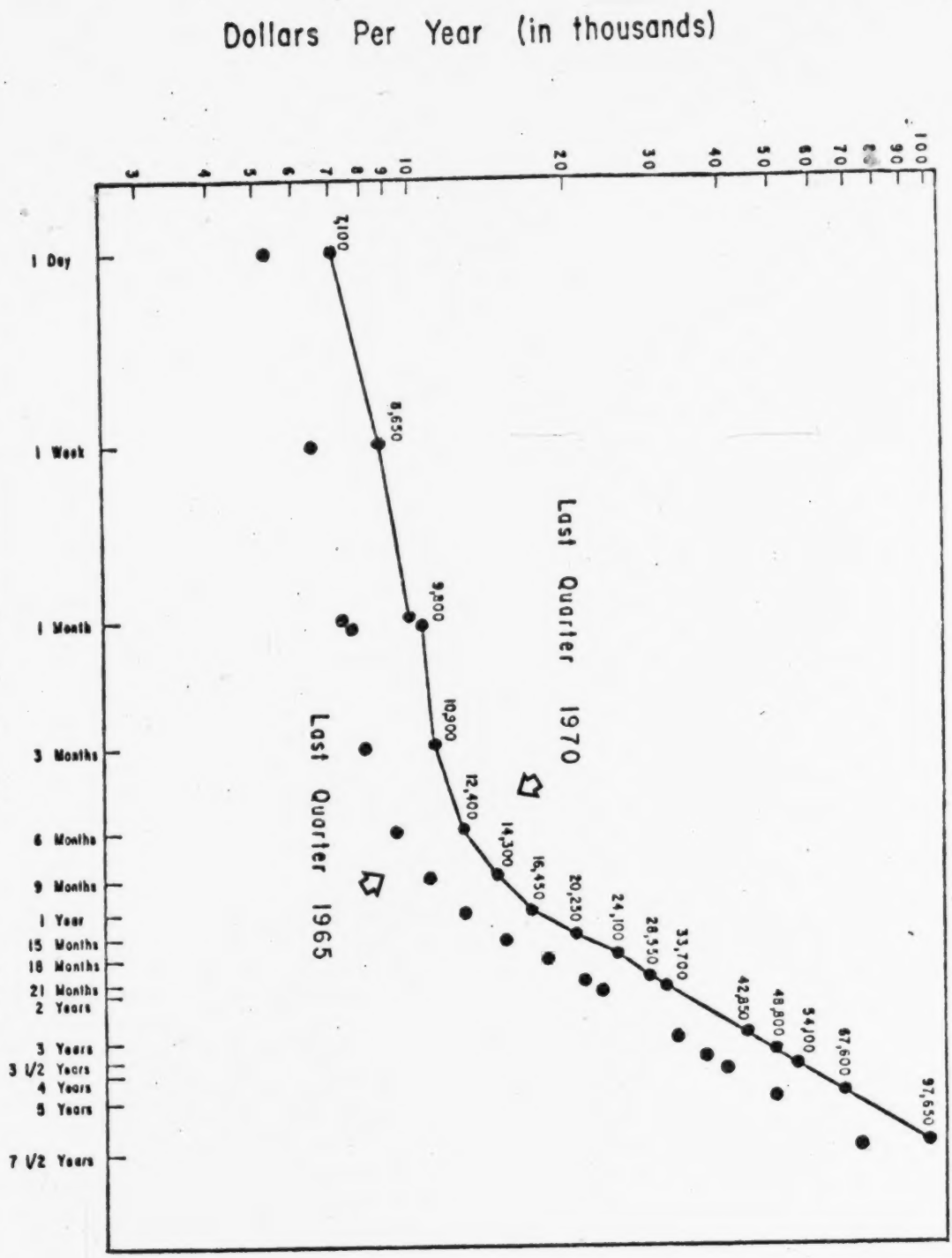
Dollars Per Year (in thousands)
3
4
5
6
7
8
9
10
20
30
40
50
60
70
90
100
7,100
8,650
9,800
10,900
12,400
14,300
16,450
20,250
24,100
28,350
33,700
42,850
48,800
54,100
67,600
97,650
Last Quarter 1970
Last Quarter 1965
1 Day
1 Week
1 Month
3 Months
6 Months
9 Months
1 Year
15 Months
18 Months
21 Months
2 Years
3 Years
3 1/2 Years
4 Years
5 Years
7 1/2 Years
Level of responsibility (in time-span units)

Fig. 1

Testing the validity of the general wage and salary index we had developed proved much more difficult than we anticipated. The reason was that in practically all firms we approached for data, reorganizations occur with considerable frequency. Although position titles usually remain intact, both their work content and the responsibilities assigned into them tend to change; in a sense such changes are both the reason for and the essential feature of reorganization. Only one firm - a municipal utility - came close to the ideal. Over some twenty years there had been no major changes in the positions (roles) of General Manager, Manager of Production and Distribution and Chief Engineer. In two other higher management positions, that of Company Secretary and Supervisor of Procurement, as well as in other positions for which data were unavailable, there had been more extensive changes during the same period.

As shown in Table 1, in all but the Chief Engineer position there had been two occupants each since 1950; the Chief Engineer position had four occupants. The salaries adjusted by the inflation index in the last column manifest considerable constancy, although there is some tendency for them to drop. For the last two roles the drops were steepest as expected, but even those for the first three positions were steep enough to cause some concern over the validity of the index. By checking the average annual rises in the index during four consecutive quinquenia 1950-1970, we found that the rate of increase in the period 1966 through 1970 had doubled*. This finding provided a possible explanation for the drops. In times when salary and wage inflation goes through a phase of rapid acceleration, as it evidently did from 1965 onwards, smaller firms and publicly controlled firms are likely to lag in their response to the trend and are slow in adjusting their salary scales to the new standard. The discrepancies we found were certainly small enough to accommodate such an explanation.

Subsequent research where use was made of the index has since increased our confidence regarding its validity. We now turn to investigations involving applications.

1.2 Trouble Shooting Organizational Structure

Under the generally approved slogan of decentralization and increased local autonomy, the practice has become widespread in many organizations for job or position description to be prepared which are known in advance to reflect neither the nature of the duties nor the weight of responsibility attaching to the position. Job titles which may at one time had been useful shorthand descriptions, have become virtually meaningless. In the administrative apparatus, especially of larger organizations, the proliferation of these titles is rapidly obliterating what little information they may still convey. In the Armed Forces these developments are paralleled by growing divergencies between ranks - which determine rates of pay - and the actual duties performed. Centralized organizations thus do not appear to be immune.

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* The average annual rises in the index were as follows:

1950 through 1955	4.2 points
1956 through 1960	3.6 "
1961 through 1965	3.4 "
1966 through 1970	7.2 "

Table 1

Salaries of Occupants of Five Positions in a Municipal Utility 1950 - 1969 Adjusted For Wage Inflation

Positions and Occupants	Starting Date in Position	Yearly Salary ($)	Index (Last Quarter) 1965 = 100	Yearly Salary Adjusted by Index ($1965)
General Manager				
Occupant 1	5/1/50	13800	43	32100
Occupant 2	9/3/68	37800	120	31400
Manager of Production and Distribution				
Occupant 1	8/1/58	12300	72	17040
Occupant 2	10/22/68	20700	122	16920
Chief Engineer				
Occupant 1	10/16/50	12000	49	24480
Occupant 2	8/1/58	17400	72	24156
Occupant 3	5/1/65	21600	97	22272
Occupant 4	9/3/68	26400	120	21996
Company Secretary				
Occupant 1	1/1/59	16800	75	22406
Occupant 2	4/11/67	21600	110	19632
Supervisor of Procurement of Materials				
Occupant 1	9/1/50	6900	47	14676
Occupant 2	10/1/69	16320	130	12552

The nub of the problem seems to lie in the absence of suitable mechanisms whereby organizations might take periodic stock of their structural status, meaning the existing balance between the tasks and objectives it has been created to fulfil and the staffing at various levels. Among the factors that prevent such mechanisms from coming into existence are not so much the failure to specify the desired balance as the absence of suitable means of tracking down departures from it. The LR-EP function offers a useful start in this direction.

Renewed reference to Fig. 1 will show that if we can measure the Level of Responsibility of a role (position), whether in Timespan units or in some units that are highly correlated with pay, it becomes possible to specify the corresponding equitable entitlements. Conversely, from a knowledge of the actual entitlements going with a given position we can determine what should be the Level of Responsibility that would make these entitlements equitable. If we knew both the actual entitlements and the Level of Responsibility, we could specify (depending on our particular focus) which positions are overpaid, equitably paid or underpaid, or which carry too much, too little or the right amount of responsibility.

However, since in most positions above "shopfloor" level responsibility and actual pay appear to be in fair equilibrium (Jaques, 1961), any adjustments are not likely to make much of an impression on the organization. More striking insights are liable to be gained by examining the total configuration of positions in each of a set of functionally distinct, yet mutually dependent units, or branches of the hierarchy. The first step is to line up the salary brackets of all the positions and adjust them to a common base line* using an index, and through the LR-EP function, devising the corresponding Level of Responsibility brackets. A useful adjunct to this procedure is a chart of the kind shown in Fig. 2, where the (adjusted) salary scale and the Level of Responsibility scale are lined up next to each other. Every position can be represented by horizontal lines denoting the bracket and enclosed by vertical lines so that each position is enclosed by a box. The boxes can then be joined by the network of lines familiar from conventional organization charts. This gives a picture of the dispersion of responsibility throughout the staff of the organization we wish to scrutinize.

In practice we have found that this relatively simple device is a powerful means of exposing structural anomalies that have persisted for years, and that are often behind conflicts and frictions ascribed to personality incompatibilities and to other interpersonal factors. Here are some examples of such anomalies and associated difficulties:

(a) The brackets of a managerial position and of many or all of its immediate subordinate positions (which may themselves be managerial) overlap, or are very close together. So small a differentiation in responsibility levels will almost force the occupants of the subordinate positions to refer frequently to a manager at one or two removes above their own. To safeguard his position from being undermined and to cope with a direct threat to himself, the immediate manager may either deny his subordinates the support they need or

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* We have used the wage and salary levels prevailing in the last quarter of 1965 as our base line.

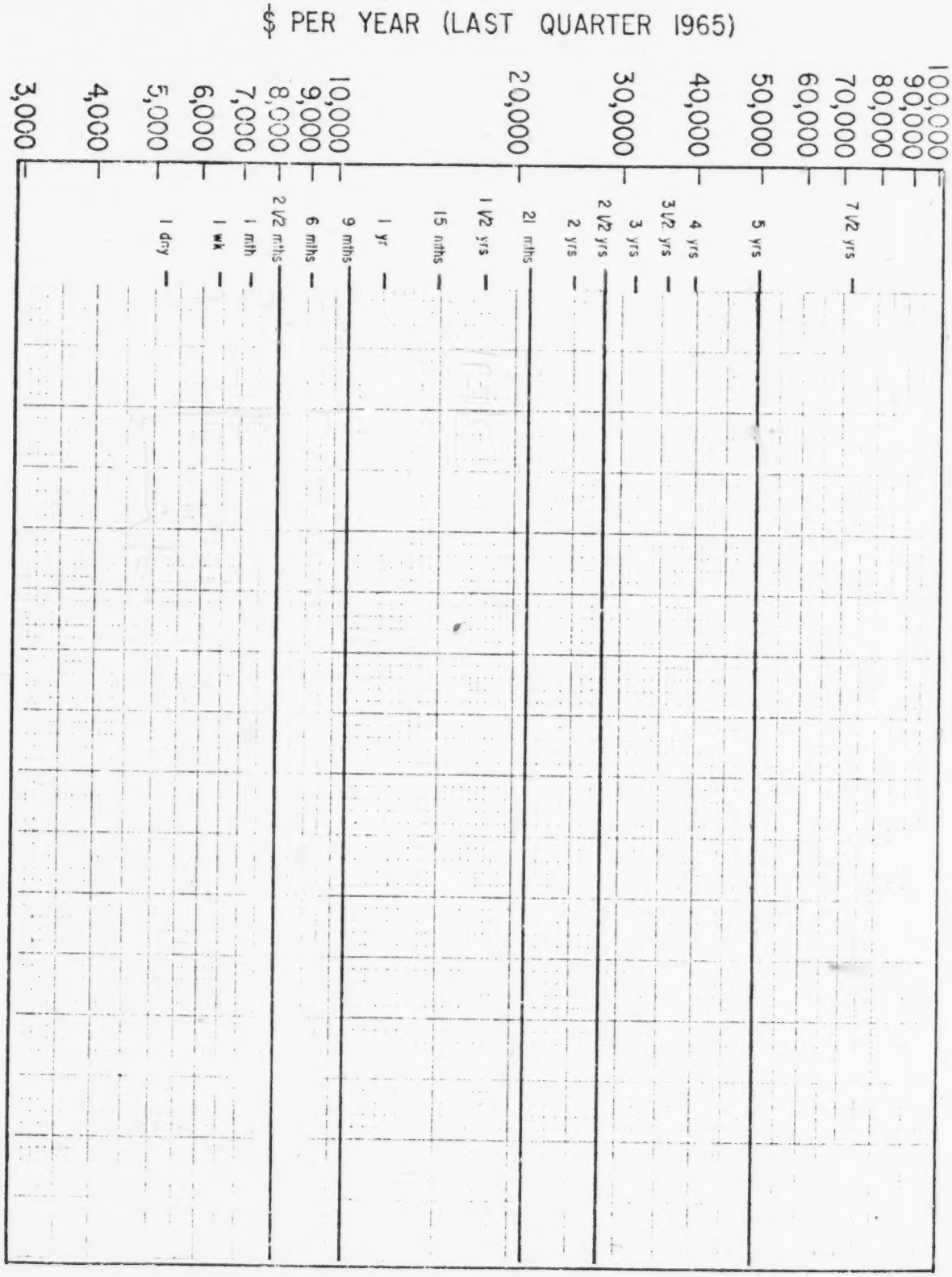
$ PER YEAR (LAST QUARTER 1965)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
7 1/2 yrs
5 yrs
4 yrs
3 1/2 yrs
3 yrs
2 1/2 yrs
2 yrs
21 mths
1 1/2 yrs
15 mths
1 yr
9 mths
6 mths
2 1/2 mths
1 mth
1 wk
1 day

Fig. 2

he may, whenever a vacancy arises, seek to select occupants whose capacity for carrying responsibility is one step below that justifying the salary for the position. This in turn may raise questions in the minds of other employees regarding equity in the organization's salary structure.

(b) Some immediately subordinate roles of the same managers are in lower brackets than others. This almost always has several consequences. First, the manager will be less accessible to the occupants of the lower brackets than to those in the higher brackets, and may even exclude them from meetings, deprive them of voting rights or attach less weight to their statements or comments. Second, the occupants in the higher brackets will come to look upon themselves as managers of those in the lower brackets and these in turn may accept this and occasionally play off against each other their real manager and their presumptive manager, occasionally complaining of having two bosses.

(c) The separation between the brackets of the manager and of his immediate subordinate roles is excessive, i.e. there is a gap in the chain of command. A case falling under this heading has recently been brought to our attention by the Director of Organization and Planning of a large Bay Area firm, who, after reading of the method described above in a published paper of a member of the ONR project team (Laner, 1972), decided to try it out. In two "problem" departments where he found gaps in the role structure there were constant complaints about communication. The managers maintained that their instructions and memoranda were consistently misinterpreted and distorted by their subordinates and suspected that this was intentional; the subordinates complained of never receiving sufficiently detailed and explicit instructions and of being rebuffed whenever they asked for additional clarification.

(d) Top-heavy hierarchical structures* - a phenomenon that has long been noted, and has at the same time proved intractable to analysis. It shows up on the charts as a pattern of layers upon layers of tightly packed and frequently overlapping position brackets - an accumulation of what has been described above under (c). One of the strongest objections to top-heaviness is the excessive overhead costs it entails. This cost can be readily derived by taking the midpoint dollar figure of each bracket, multiplying it by the number of positions in each bracket, and summing over the whole hierarchy or over separate parts of the hierarchy**. What should be the ratios of the overhead to direct payroll costs, or the ratios as between the zones cannot be specified; for the general case it depends on a number of variables,

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* "Indeed, most companies are just building, building, building on the old - adding layers of vice-presidents, overstructuring and getting horribly top-heavy" - Peter Drucker in Dun's, April 1971.

** The following Timespan value (see second scale on chart in Fig. 2) have been adapted from Wijnberg (1965) as providing approximate benchmarks delimiting managerial zone boundaries:

Lower Management $2\frac{1}{2}$ - 9 mos. Timespan
Middle Management 9 - 21 mos. "
Higher Management 21 - 30 mos. "
Corporate Management above 30 mos."

especially the nature of the product or service, the relative state of advancement in the technology or technologies used to provide them, the ease of procurement of the necessary inputs into the production process, the state of the market, etc.

Several of the structural anomalies discussed above can occur in different parts of the same organization. In addition there may be others and possibly more subtle ones that we have not yet identified. Those that have been discovered and analyzed are, however, sufficient to establish the usefulness of the method put forward. Used in conjunction with other methods still to be described, it would seem to supply some important elements of a rational approach to the kinds of reorganization that will produce a real enhancement of an organization's operational effectiveness.

1.3 A Case History of Organization Redesign

An opportunity to put the method to a practical test occurred in an enterprise employing some 2000 people and located in the San Francisco Bay Area. Changes in the demand pattern for the company's services had reached a point where the need for a restructuring of the main operating division had been acknowledged and several reorganization plans were actually in the process of preparation. Subject to a guarantee of anonymity, the planning department agreed to give us access to data and to allow the outcomes of any alternative plans we might come up with to be published. We were not given sight of the internally developed plans.

Heading the Operating Division was a Divisional Manager who, at the time of the study, had total entitlements (salary + fringe benefits) of $29,900. His five immediate subordinates, each in charge of a department, all had the same total entitlements of $23,800. Subordinate to them were between two and five Section Supervisors with entitlements ranging from $14,960 to $21,700. These entitlements reduced to base-line dollars (last quarter 1965) and their corresponding maximum Timespans (Levels of Responsibility) are:

Divisional Manager	$22,150	-	22 T.S. months
Departmental Managers	$17,630	-	18 T.S. months
Section Supervisors	$11,080-16,120	-	11 to 16 T.S. months

In Fig. 3 all these positions have been projected on to the chart shown in Fig. 2. The functional area of each Departmental Manager is shown in bold letters in the upper half of the chart.

Noticeable at once is the compression of all lower and middle management portions into the middle management zone, with the difference in Levels of Responsibility between Departmental Managers and Section Supervisors never larger than 7 mos. (in Timespan Units) and in two instances as small as 2 months. With only 4 timespan months separating them from the Divisional Manager position, the Departmental Managers clearly find themselves in a squeeze and their immediate subordinates are as likely to by-pass them in seeking instructions from the Divisional Manager as he is in handing directives down.

Inquiries following this finding revealed that of the five Departmental Managers, one had been away for some time with a chronic illness; two were approaching retirement age and were kept in the picture by their subordinates only to the extent that the Divisional Manager insisted on it; the fourth, who lacked his manager's support, was clearly being by-passed; and the fifth, a young and aggressive individual, retained his incumbency of the position only nominally while being groomed for a higher position; in the main, his "grooming" consisted in occupying the unofficial position of Deputy Divisional Manager. Due to this circumstance, the Divisional Manager did not complain of being overworked as much as he could have been expected to otherwise. The system kept operating smoothly, despite the effective absence of the Departmental Manager group.

For redefining the structure, the first possibility that suggested itself involves the simple upgrading of the two top positions. Ignoring for the moment the actual immobilization of the Departmental Manager Level, such a move would appear painless for the occupants of all positions concerned. From the organization's point of view, on the other hand, the change would imply that:

(1) the lower management band continues to remain unoccupied;
(2) for the six occupants of the top position, the level of the assignable responsibilities cannot be made to match the new salary levels; and
(3) the total overhead payroll cost, already considered high, would increase by at least 10% without commensurate pay-off.

A second possible redesign, shown schematically in Fig. 4, would take explicit account of the fortuitous attrition of the incumbent Departmental Managers and abolish the position. Accelerated retirement for three of the Managers and an agreed solution with the fourth would have to be arranged. The division would be split into an Operations and Distribution, and an Engineering and Survey Division, one headed by the incumbent Divisional Manager, the other possibly by his present unofficial Deputy. The Section Supervisor structure would be left basically intact. By comparison with the present situation the reorganized structure holds out the prospect of stronger leadership; and its implementation would yield a near 20% annual saving in personnel costs. Its main drawback is that it still leaves the divisions without adequate lower management.

This shortcoming is finally disposed of by the third redesign possibility shown in Fig. 5. It might perhaps best be regarded as a longer term solution, to follow the preceding design introduced as an interim measure. The resuscitated Departmental Manager position has been slightly downgraded, and its occupants would be selected from among the present Section Supervisors. It might take five or more years before the 16 existing occupants of this latter position have decreased by two thirds through transfers, departures and possibly promotions. A careful plan would have to be worked out for the progressive reassignment of duties between the middle and lower managers, the latter recruited partly from first line supervision, partly from outside. As shown in Table 2, the final reorganization can be accomplished at no extra cost and in fact there may be a further small saving.

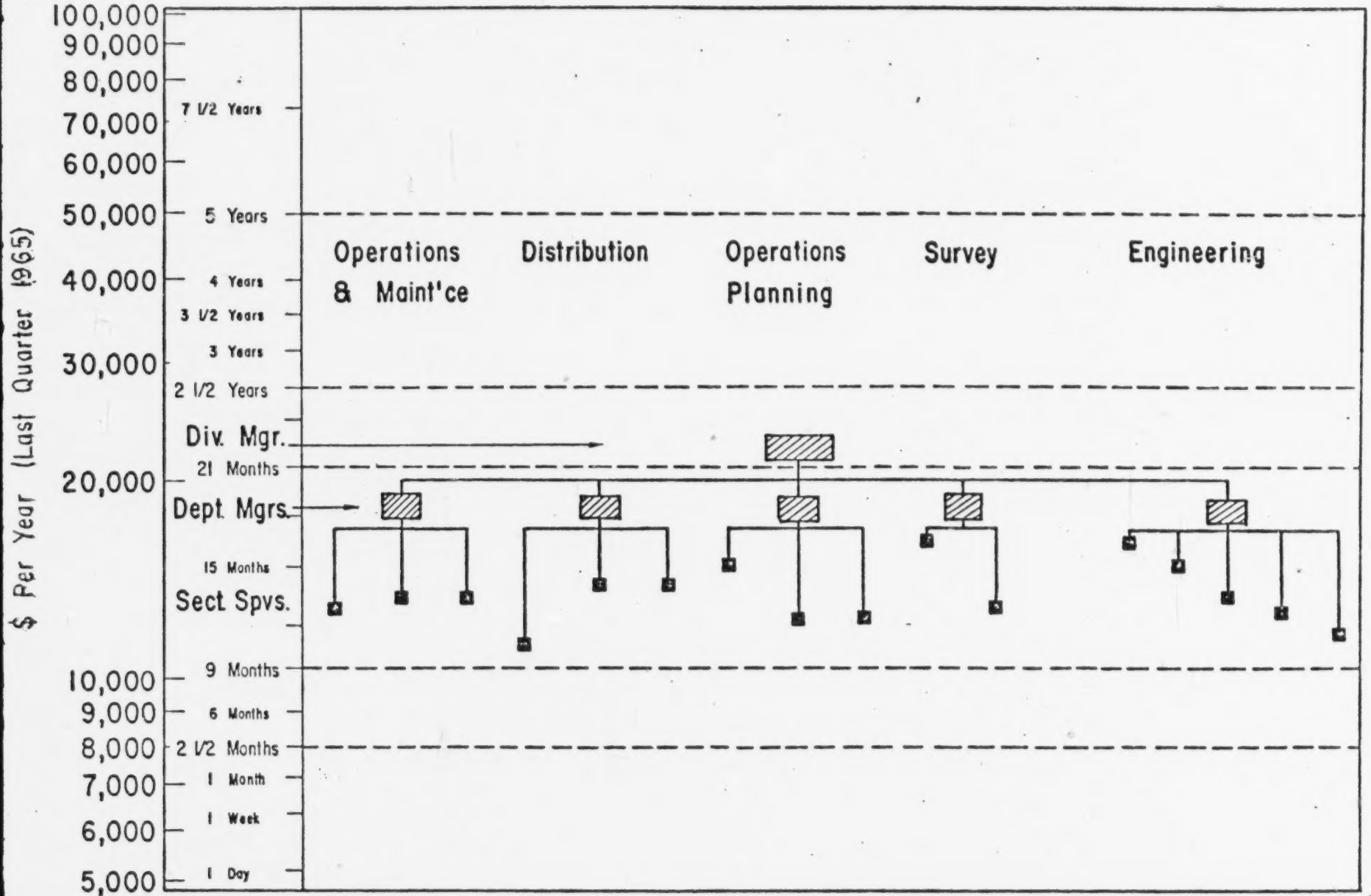
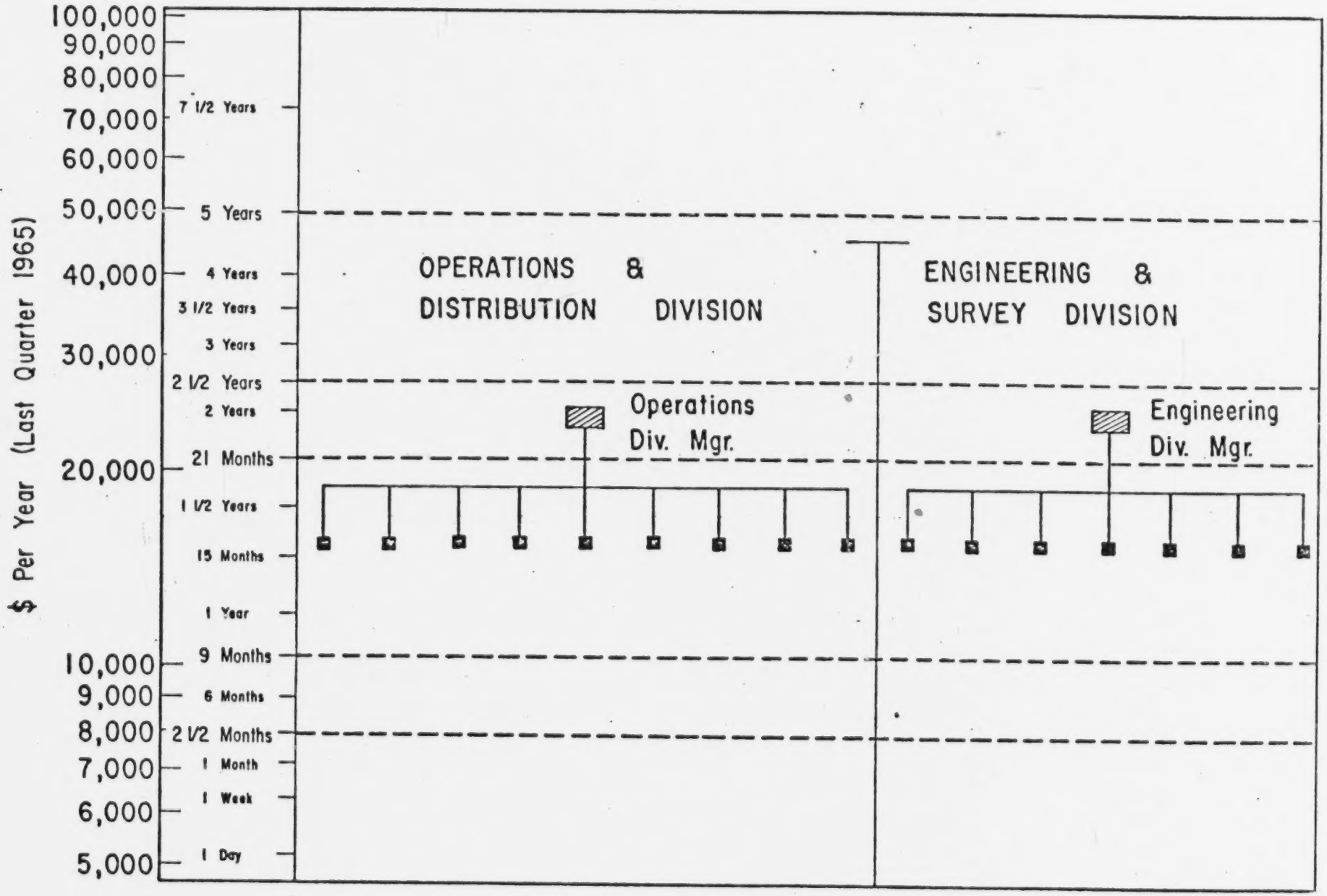

$ Per Year (Last Quarter 1965)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
9,000
8,000
7,000
6,000
5,000
7 1/2 Years
5 Years
4 Years
3 1/2 Years
3 Years
2 1/2 Years
21 Months
15 Months
9 Months
6 Months
2 1/2 Months
1 Month
1 Week
1 Day
Operations & Maint'ce
Distribution
Operations Planning
Survey
Engineering
Div. Mgr.
Dept. Mgrs.
Sect. Spvs.

Fig. 3


$ Per Year (Last Quarter 1965)
100,000
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70,000
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9,000
8,000
7,000
6,000
5,000
7 1/2 Years
5 Years
4 Years
3 1/2 Years
3 Years
2 1/2 Years
2 Years
21 Months
1 1/2 Years
15 Months
1 Year
9 Months
6 Months
2 1/2 Months
1 Month
1 Week
1 Day
OPERATIONS & DISTRIBUTION DIVISION
ENGINEERING & SURVEY DIVISION
Operations Div. Mgr.
Engineering Div. Mgr.

Fig. 4

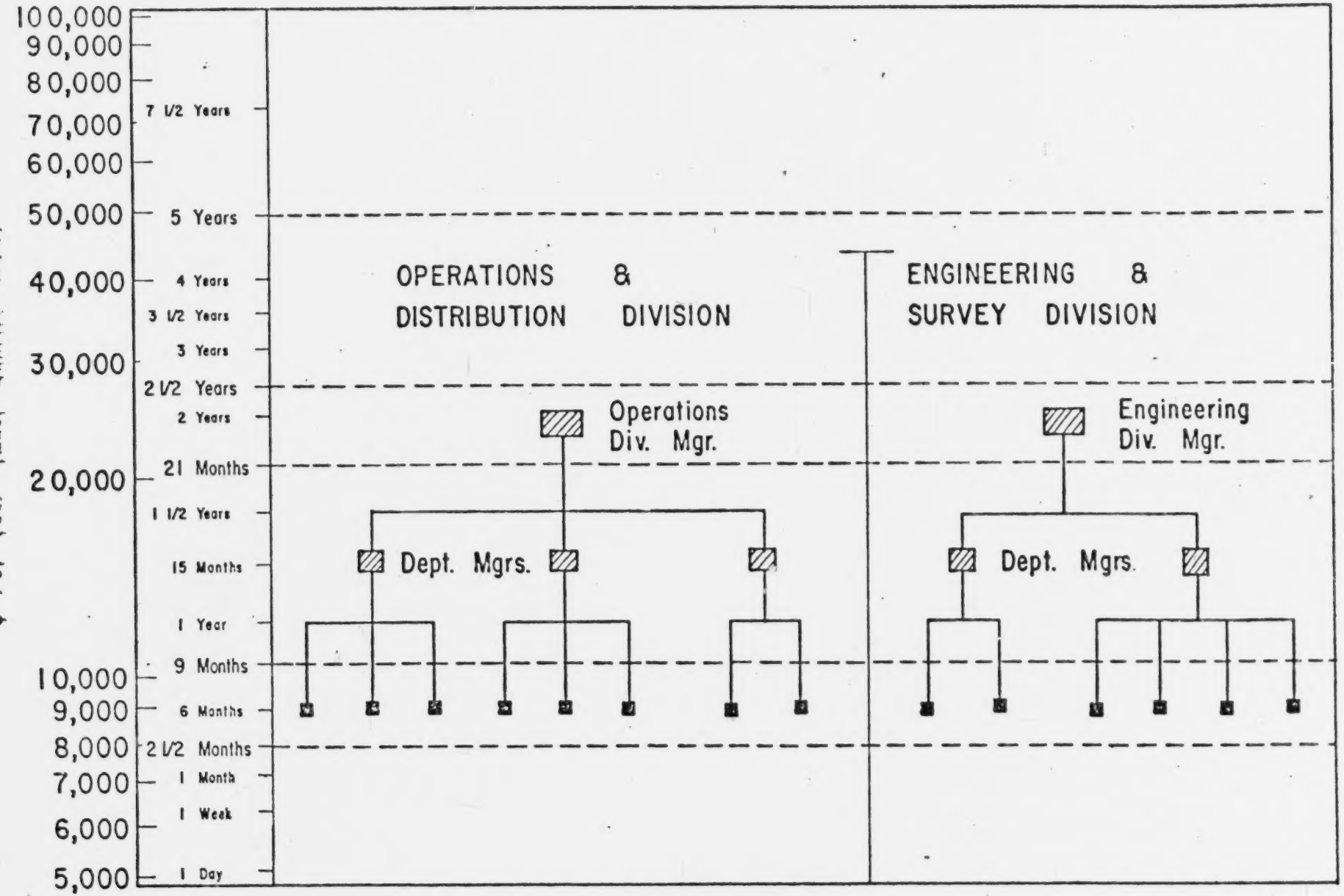
$ Per Year (Last Quarter 1965)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
9,000
8,000
7,000
6,000
5,000
7 1/2 Years
5 Years
4 Years
3 1/2 Years
3 Years
2 1/2 Years
2 Years
21 Months
1 1/2 Years
15 Months
1 Year
9 Months
6 Months
2 1/2 Months
1 Month
1 Week
1 Day
OPERATIONS & DISTRIBUTION DIVISION
ENGINEERING & SURVEY DIVISION
Operations Div. Mgr.
Engineering Div. Mgr.
Dept. Mgrs.
Dept. Mgrs.

Fig. 5

TABLE 2: EXAMPLE OF COST SAVINGS ACHIEVABLE THROUGH CHANGE IN ORGANIZATIONAL STRUCTURE

	Title	No.	Level of Responsibility	Annual Entitlements ($)*	Total Annual Cost ($)*	Annual Cost Saving ($)*
Present Structure (Fig.3)	Divisional Manager	1	22 months	29,900	29,900	
	Departmental Manager	5	18 months	23,800	119,000	
	Section Supervisor	16	11-16 months (Average 13 mos.)	14,960-21,760 (Average 18,000)	289,680	
		22			438,580	
Alternative Structure I (Fig. 4)	Divisional Manager	2	2 years	32,640	65,280	
	Section Supervisors	16	11-16 months (Average 13 mos.)	Average 18,000	288,000	
		18			353,280	85,300(19%)
Alternative Structure II (Fig. 5)	Divisional Manager	2	2 years	32,640	65,280	
	Departmental Manager	5	16 months	21,760	108,800	
	Section Supervisor	14	3-9 months (Average 6 mos.)	Average 12,240	171,360	
		21			345,440	93,140(21%)

* All entitlements, costs and cost savings are in 1970 dollars.

1.4 Towards a Methodology of Organization Design

In line with our expectations, the reorganized structures outlined were not received with enthusiasm. In fact, the entire approach quickly came under attack on the grounds that it largely addressed positions and ignored their occupants. Though never stated expressly, the basic objection was clearly against the apparent dehumanization of the organizational design process.

A facile answer to this objection would be that it is hard to envision any reorganization where some employees do not get hurt and others profit Whether recognized or not, organizations are never designed nor are they redesigned around those employed in it. That there are occasional localized exceptions in no way invalidates the rule. Unless built up, as a whole and in each of its functional parts, around what has variously been called the mission (Selznick, 1957) or primary task (Rice, 1963) the fate of the enterprise or institution is in jeopardy, much less that of its members.

The nature of this issue has been succinctly summarized by Rice (op. cit.):

> "In the first stages of model building, the only considerations are those of the primary task and available resources for performance. That the organization will in practice have to be staffed by human beings and thus become a socio-technical system, is relevant only when comparisons are made between the model and practical reality. The independent demands of the social system - the social and psychological needs of the members of the organization - may then appear as constraints on performance."

Coping with the latter constraints is as much part of the intrinsic function of management as it is to cope with any other constraints. The thrust of Rice's contention and of that of other current organization theory is that managements have hitherto been far less assiduous in examining the nature of these particular constraints and far less serious in including them in their considerations than they have been with respect to technological, economic and other constraints? A redress of the balance is long overdue. Most contemporary organization theorists are also concerned lest this redress take the form of the "human relations fallacy" - reliance on the improvement of human relations as an alternative to the much more exacting business of evolving appropriate structures and modifying the technology of processes.

The implication of all this is that many of the decisions hitherto considered to be in the sphere of individual managers, supervisors and foremen are requisitely matters of policy and should therefore be made at policy levels of organizations. Lower levels have neither the overview nor the authority necessary for instituting changes in structure or technology, any more than they can decide on overall objectives. Yet in few enterprises or institutions does attention given the structure of the work system amount to more than the sporadic revision of organization charts. At best, these convey a highly stylized and static representation of structure as it was at the time of preparation, modified by the draftsman to satisfy his aesthetic preferences. The only practical use these documents appear to serve is to give the visiting outsider a first orientation in the corporate maze.

The methodological advances outlined in the preceding and next parts of this report can be taken as demonstrating that the prerequisites now exist for an analytic approach to organizational design. Already a strong case can be made for continuing efforts to account for known dysfunctions within an organization in terms of structural processes and to introduce changes to test the hypotheses. By dysfunctions we mean such phenomena as interdepartmental or interpersonal conflicts, formation of contending cliques, the rapid turnover of incumbents through certain roles, excessive localized absenteeism, lowered morale confined to particular functional areas, etc. Inevitably this approach would generate alternative models for parts of the organization and ultimately for the organization as a whole. It would also initiate the development of structural principles and create new analytic techniques.

Above all, however, analytic reports on the structural status of an organization would reduce the entire sphere of concern to a format suitable for inclusion as a standing item on the agenda of policy making bodies. Some of the benefits that can be confidently expected to accrue to an organization include, aside from the removal or attenuation of interpersonal difficulties:

A closer alignment between the mission of the organization and the personnel establishment charged with carrying it out;

An improved basis for forecasts of staffing shortages and surplusses over varying periods ahead;

Replacement of essentially reactive recruitment, selection and executive development policies by anticipatory policies;

Frank and open appraisals, jointly with the present occupants of individual positions, of their future prospects within the organization;

Monitoring of the functional subcomponents of the organization, especially of its internal supportive and servicing functions, to assess (a) the need for their continued retention, (b) the size of their staff establishments and (c) the qualifications, experience and level of competence required; all these relative to the organization's present and anticipated needs;

Advance design of alternative structural models to meet planned and contingent changes, dictated by market, economic and technological developments;

Initiation of personnel policies to minimize the frictions and individual insecurity and damage associated with the transition from one model to another;

Savings in costs arising directly from emergency recruitment and dismissals; and indirectly from fall-offs in performance and voluntary resignations triggered by these emergency measures.

To return to the example of reorganization described in Section 1.3, we contend that rather than supporting the case against the suggested approach, its detrimental effect on some incumbents in not a telling argument. Two aspects in particular need stressing. First, it was foreseen that the transition from the present to the last alternative structure would be accomplished in two

stages. Interposition of an intermediate structure was predicated precisely on the grounds of minimizing the adverse impact on individual incumbents, while taking advantage of attritional factors already in process. Secondly, if the organization were to adopt the approach as a permanent means of examining itself, the rearrangements decided upon would in most instances be less in extent, as well as being spread out over longer time periods.

2. THE ASSESSMENT OF CAPACITY FOR RESPONSIBILITY

2.1 Some Sources of Discontent in Organization

Up to this point organization has been treated consistently in terms of the abstracted constructs of role or position. The critiques and discussions of techniques for measuring level of responsibility were concerned with the responsibilities assigned into roles; by equitable payments we meant payments commensurate with the responsibility load of roles; and the proposed methods for analyzing organizations addressed the structure of roles and its properties, not the idiosyncratic characteristics of any particular aggregate of position holders. This approach was guided by the important, though often overlooked, consideration that organizations are created to fulfil missions and pursue objectives transcending the individual motivations and personal interests of their membership, and that they can only survive as long as they are able to harness the energies of the majority of their membership to the joint mission.

Evidence that this principle goes unrecognized in many enterprises or institutions, or if recognized, is tacitly ignored, are not hard to find. Such phenomena as empire building, obtrusions by one manager into the functional areas of another, and boundary conflicts are some of the more familiar manifestations. The substitution of informal for formal organization is another. Its ubiquity and tenacity in most organizations shows that the formal arrangements may be unworkable, or that a subgroup of employers is only willing to give conditional allegiance to the overall mission; more important, it also suggests that no consistent effort is made to keep the fittingness of the role structure to the organization's mission under review.

The next point to be made is that the involvement of policy makers in the selection of structures conforming to the organization's mission, in ensuring that the executive hierarchy is not top-heavy and the levels within it are evenly distributed, and that the payment brackets for each role match the responsibilities assigned into it, does not supplant the need for decisions regarding the present and future occupants of the roles. For the purpose of a well designed role structure is not to act as a straitjacket but rather to provide a framework within which the changing capacities of individual employees can freely develop and be seen to develop, both by themselves and by the organization. Contrary to a fairly general practice, visible in its clearest form in the military, the progressing of individuals through organizations cannot be built into the organizational design. Stereotyped promotion policies and equal across-the-board pay increases are symptomatic of a failure to distinguish between the relatively enduring quality of roles, and the growth and change characteristic of individuals occupying roles.

Whether the design and monitoring of its role structure, the coincidence between the formally decreed and the actual relationships between the role incumbents, and the balance between the levels in the hierarchy, etc. are accorded high or low priority in the higher councils of an organization, none of it is experienced by its employees directly. Imperviousness to individual progress and individual differences, on the other hand, is felt by the employee directly and is seen by him as a major defect in organization policy, and often mistakenly interpreted as a defect in its structure. From discussions with many employees in a variety of positions in both civilian and military establishments we came away persuaded that personnel policies, too, are lagging behind

what their membership consider it has a right to expect. The topics around which our interviews mainly revolved, namely discretion, responsibility and equitable payment, seemed especially helpful in enabling our respondents to articulate what they saw as the chief deficiencies in the relationships between the employing organization and themselves as individuals. The dominant themes had little in common with the published results presented in the now large volume of studies of job satisfaction and dissatisfaction, with the sole exception of those advanced by Herzberg et al (1959).

On repeated occasions we were assured by respondents that if and when the responsibilities assigned (or the amount of discretion allowed) coincided with the individual's capacity to cope with them, this happened only as a matter of chance. While there are, evidently, procedures and standards for evaluating performance, no mechanism was experienced to exist which would assess the balance between individuals' capacity and the responsibility load of the role actually occupied.

Next, neither praise, commendations nor monetary rewards appear to be viewed as an acceptable substitute for the personal development offered by a graded incremental succession of more and more demanding assignments. Increases in salary and wages were felt to be of significance only to the extent that they cohered with enlargements in the scope of responsibility.

Thirdly, frequent references were made to the alleged unconcern and disinterest of managers at all levels superior to the respondent with his career pattern and prospects within the organization, let alone outside it. Instances of favoritism were sometimes quoted in support of what was seen as the general rule.

In the light of these observations, some apparent inconsistencies we found in our findings are starting to fall into place. We noted the often overheard complaints by individuals at levels below top management (i.e. in positions with Timespans less than 21 months), who form the bulk of the employed labor force, that they were underpaid relative to their responsibilities. These complaints seemed hard to reconcile with the finding that most of the participants in Level of Responsibility measurement interviews considered the actual pay for the jobs they held to be fair or equitable*.

A hypothesis that might account for the discrepancy is this. In talking with others about their work, people do not normally discriminate between the responsibilities attached to the jobs they hold and their own capacity for exercising discretion. In the general course of events it is likely, in fact, that the quality of the decisions they make is determined by their discretionary capacity rather than by the job specification. But since it is performance which is subject to evaluation and not capacity, and since furthermore payment is tied to positions and even exceptional performance often goes unrewarded, the conclusion drawn by many that they are underpaid is not as self-contradictory as appears at first.

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* It was also noted that professional members of the military did not share this view.

The hypothesis is not intended to imply that self-assessments by individuals from which judgments of underpayment conceivably derive are necessarily accurate; such judgments are liable to be distorted by the absence of other than purely subjective and egocentric standards of reference. Nor does the hypothesis commit us to an acceptance of the criticism imputing to managers and managements generally indifference to the personal and career developments of subordinates. What it does point to is the need for an effort to look afresh at the question of discretionary capacity and to estimate the outlook for more systematic methods of predicting the course of its development in the individual case.

2.2 Use and Significance of Past Earnings Records

The question is often raised why the Timespan estimate obtained for a position cannot also be taken to represent the level of discretionary capacity of its incumbent. How this misconception originates is not hard to detect. Positions are normally occupied, and it would be intolerably pedantic to keep insisting during Level of Responsibility measurement interviews carried out with the position's manager that its occupant not be mentioned by name. As a result it is only too easy for the analyst to conclude at the end of an interview that the Level of Responsibility value(s) obtained for the position of Chief Planning Officer is also a valid measure of the capacity of John Doe who happens to occupy it. This conclusion becomes all the more likely if the manager expresses satisfaction with the occupant's performance, as is frequently the case.

Satisfactory performance, however, is only evidence that the role demands for responsibility are within the occupant's capacity to meet, i.e. that his capacity is not less than required. Left out of account is the possibility that John Doe is capable of holding down successfully a much more demanding job. Especially under conditions where involuntary unemployment is endemic, and where even high-ranking managerial and technical personnel is not spared, the probability of individual capacity going underutilized cannot be lightly dismissed. There are additionally other factors, some intra-organizational, some personal, which quite often bring about temporary or permanent individual underemployment. Conversely, it is also likely that full employment, particularly if sustained over a long period of time, would encourage individuals to seek out positions enlisting their full capacity. Hence while Level of Responsibility measurement bears essentially on the question of over, under or equitable payment relative to a position, the question of whether a given occupant is over, under, or appropriately stretched in the job requires an independent measure of capacity.

Unfortunately, attempts by ourselves and by others to develop tests of capacity or other measuring procedures have not so far advanced to the point where ultimate success can be confidently predicted. Capacity for carrying responsibility has not yet even been analyzed into its components, though Jaques was quick to note that it is "something more than that which is measured by intelligence tests, as has been demonstrated repeatedly in studies of the relationship between intelligence and successful discharge of responsibility both in industry and in the armed services." In our observation this "something more" manifests itself quite strikingly as a sense of timing, relative to when information gathering and processing must be cut short to give way

to action. What outsiders are often liable to regard as a special propensity for risk-taking, is as often looked upon by the alleged risk-taker as nothing of the kind. He knew when delaying action would have meant an irretrievable loss of opportunity. Intelligence as a component is not thereby excluded; on the contrary, insofar as actions involve foresight of their consequences, intelligence is an indispensable ingredient.

As of now, the status of capacity measurement can be characterized on the analogy of a man trying to determine the capacity of a container to which he has no direct access. The only way open to him is to keep pouring liquid from a graduated pitcher and take a reading when the container has just overflowed. Likewise, the limit of an individual's capacity will have been reached when the addition of a further increment of responsibility causes him to break down under its accumulated weight. It would hardly be advisable to adopt this approach as a practical expedient *: the loss of self-confidence consequent on the experience would be bound to react back on the level of capacity of individuals subjected to it.

Pending the development of a reliable measuring instrument, approximate estimates of capacity and growth in capacity can be obtained from individual earnings progressions which show both the points in time when a pay raise was awarded and the size of the award in dollars. A simple plot of an earnings history, however, confounds two very different factors, one of which are across-the-board increases given to keep everbody's compensation in line with the overall inflationary trend in wages and salary. These increases have to be screened out by reducing each point on the plot to constant dollars (see Section 1.1).

What is left is a record of changes in compensation resulting from merit and promotion raises. No logical somersault is involved in treating this record as reflecting periodic managerial ratings of an individual employee's quality of performance and, by inference, of his capacity. The fact that the ratings are expressed in dollars is not merely convenient. It also contributes to the legitimacy of using earnings progressions to gauge capacity. For it can be argued that a manager's true valuation of a subordinate is never more clearly in evidence than when the dollar is on the line, when effort and time have to be expended to secure a merit increase for him or press for a promotion carrying higher pay.

As compared with more direct methods of measuring capacity, analyses of earnings progressions, however, have a major limitation in that they cannot be made at all in cases where individuals have not previously been in employment. By the same token the reliability of such analyses is critically affected by the length of an earnings history and the number of managers whose judgments is reflects. Reliability is also influenced by an aspect of the organizational pay structure, namely so-called payment brackets. These obviate a manager's dilemma of either recognizing a subordinate's growth and seeing him promoted out of his command, or disregarding it and thereby impairing his motivation or forcing him to look for another job. The military have evidently placed themselves at a disadvantage in comparison with industry by eschewing brackets, thereby coupling increases tightly to promotion in terms of rank. This has produced many difficulties for their manpower policy and personnel management that could be avoided.

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* Although it quite often occurs in real life situations, its significance going unremarked.

2.3 Plotting and Analyzing Earnings Progressions

A complete description, with examples, of a technique for plotting Earnings Progression is given in a previously mentioned working paper (Laner and Caplan, 1969). It uses an elaborated version of the chart shown in Fig. 2 where the Level of Responsibility scale, graduated in Timespan units, has been laid alongside a logarithmic dollar scale (in 1965 dollars) on the abscissa. The reciprocal alignment of the two scales reproduces the functional relationship between Level of Responsibility and Equitable Pay shown in Fig. 1. The elaboration consists in turning the ordinate of the chart into an age scale (see Fig. 6).

Two rules have to be observed in plotting an individual earnings progression:

(1) The gross dollar earnings must first be incremented by reasonable valuations of all payments made in kind, such as the provision of a car for personal use, of housing facilities or other special services placed at the employee's disposal. Payments made under normal pension and health insurance, on the other hand, can be left out of account because of their across the board nature. Bonuses are included insofar as they are part of the employee's earnings expectations. Stock options are disregarded because they constitute expenditure, rather than receipts on the employee's part.

(2) Each dollar figure in the progression must be reduced to a constant dollar base by the application of an index that discounts the effects of wage and salary inflation. The common base in Fig. 6 are 1965 dollars ($\$_{65}$) and accordingly if the chart shown in this figure is used, all earnings figures require division by indices (or multiplication by index reciprocals) based on the general salary levels prevailing in the last quarter of 1965 (= 100).

How critical is the observance of the second rule is illustrated in Fig. 7, which shows both the uncorrected and the corrected ten year earnings histories of two employees, A and B, between the ages of 30 to 40. Employee A reached age 30 in 1951 and his job paid him $9200 at that time, employee B was 30 in 1960 when his annual earnings were $10,450. Ten years later, at age 40, both A and B's earnings had risen by a factor of more than two and a half to $24,500. Their progress along the way appears much the same and in all, there seems little to choose between them.

A re-plot of the two histories* in constant dollars dramatically alters the picture. It is immediately apparent that A and B are, in fact, individuals of quite a different caliber, as long at least as we are prepared to accept that earnings histories reflect capacity for carrying responsibility. In terms of constant dollars, A advanced from $\$_{65}18032$ to $\$_{65}31000$ in a decade of service,

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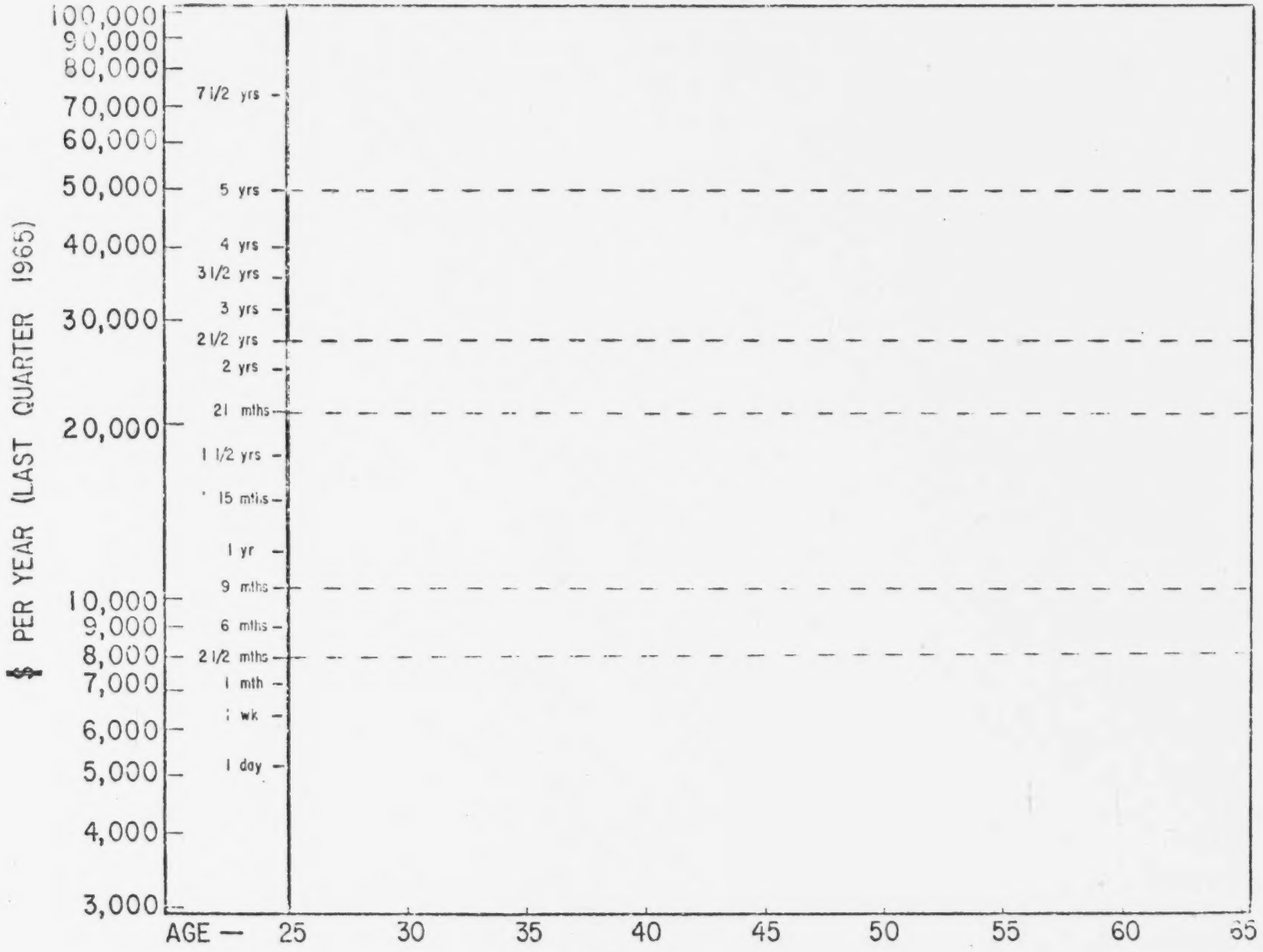
* The jagged plots in the right hand part of Fig. 7 are accounted for by the inroads of wage and salary inflationary in between successive raises. As can be seen, an increase in pay sometimes does no more than make up for the effect of inflation and sometimes even leaves the employee worse off relative to the previous level of compensation. See for example the raises received by A at age 31 and 40; and by B at 36, 37 and 38.


$ PER YEAR (LAST QUARTER 1965)
100,000
90,000
80,000
70,000
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20,000
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9,000
8,000
7,000
6,000
5,000
4,000
3,000
7 1/2 yrs
5 yrs
4 yrs
3 1/2 yrs
3 yrs
2 1/2 yrs
2 yrs
21 mths
1 1/2 yrs
15 mths
1 yr
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AGE —
25
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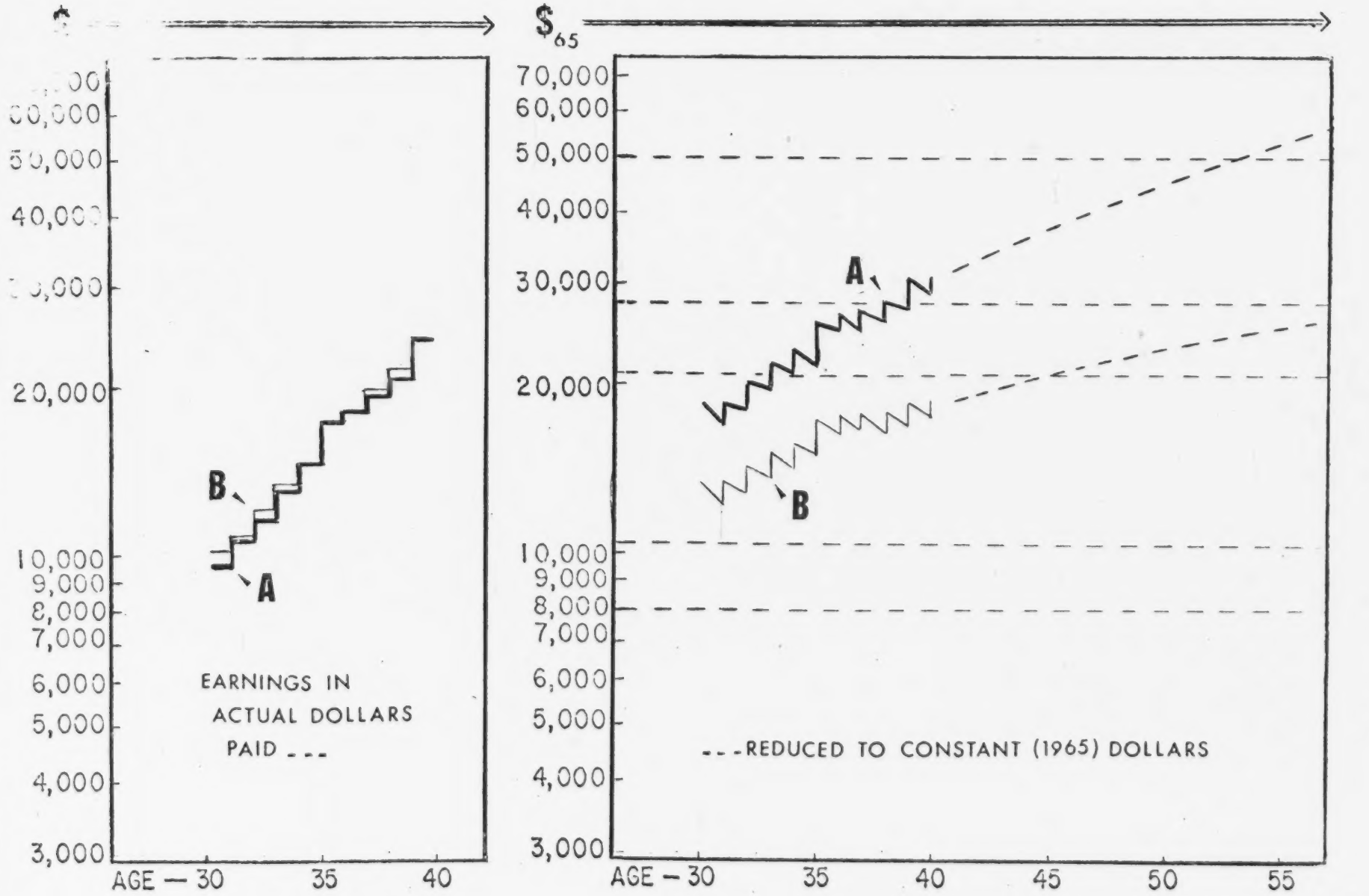
55
60
65

Fig. 6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$65
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50,000
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30,000
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9,000
8,000
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6,000
5,000
4,000
3,000
A
B
EARNINGS IN
ACTUAL DOLLARS
PAID - - -
- - -REDUCED TO CONSTANT (1965) DOLLARS
AGE — 30
35
40
45
50
55

Fig. 7

an increase of over 70%. B's entitlements rose from $_{65}$13,220 to $_{65}$18,560, a 40% rise which, after ten years' service, left him just slightly above A's adjusted earnings at the start of A's history.

Additional aspects of the relative status of A and B come into view when their histories are considered in terms of the Level of Responsibility scale corresponding to the $_{65}$ scale, and projected against the horizontal bands representing ranges of Level of Responsibility measures defining the requirements at successive management levels. B's history starts at a point about a fourth of the way into the middle management level, and ends about three fourths of the way through the band. B's best-guess forecast, based on an extrapolation of his progress up to age 40, places him onto the boundary zone about the 21 month line at or near age 44. His nine year older colleague A commenced his upward advance three fourths of the way up the middle management band, and was more than half way through the next higher band at 35. By age forty he had already crossed the next boundary. If true to form he might have been expected to be capable of carrying responsibility in excess of 5 years (timespan) by the time he reached age 51.

The two earnings histories given are not at all atypical of a sample of nearly a hundred individual progressions we have collected so far from five geographically widely separated firms in the U.S., each in an entirely different line of business. Some of the histories in the sample cover employment periods of 30-35 years' duration, and many include service in more than one firm and/or under several managers; only a very few are for periods of service shorter than 10 years. Virtually all of them, when corrected for the effect of inflation, show the same remarkable absence of discontinuities illustrated in our examples. This is an aspect of considerable importance with respect to the legitimacy of extrapolation and hence to the use of salary progressions for predictive and planning purposes.

But because visual impressions, no matter how striking, can be misleading, we started out to validate the phenomenon, a process that is not yet concluded. At this stage, three types of finding, each derived from a more intensive analysis of several histories, are worth citing.

First, least square regressions of salary on age for most of the histories (re-plotted against linear dollar scales) give a good fit, with correlation coefficients generally in excess of 0.80.

Second, when we asked employees at ages above 30 to estimate their probable earnings ten to fifteen years ahead, the values given* almost always lay very close to those we obtained through the kind of extrapolation shown in Fig. 7 for A and B.

Third, we observed that whenever an employee secures a raise, often linked to a promotion, that puts his salary (corrected for inflation) way out of line with the general trend to date of his past (corrected) progression, there is a

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* Since these values are always expressed in dollars current at the time the estimates are made, they can readily be reduced to constant dollars by applying the current index. Thus when employee B was asked in 1970 (when he was forty) what his earnings might be in 1980, he gave what he called an "optimistic" estimate of $30,000 to $31,000. The index for 1970 being approximately 0.75, the estimate reduces to around $_{65}$23,000.

pronounced tendency for the subsequent raises to lag so as to restore the general trend. The underlying mechanism may well be that the increased responsibility load associated with a large pay raise has exceeded the recipient's capacity growth rate; any further increases in responsibility must therefore be suspended until the gap has been closed through further growth in capacity. Another way of putting this is to say that the individual must learn how to cope with a disproportionate responsibility increment before resuming progress, and the leveling out in the salary progression can hence be likened to the plateaux characteristic of most learning curves.

This converging evidence from three independent sets of observations must certainly be regarded as encouraging. At the same time, however, the hypothesis it supports is substantially weaker than that proposed by Jaques. In addition to noting the continuity in earnings progressions we are presumably testing, he asserts that salary at age 30-35 is a reliable predictor of the entire subsequent earnings history, or, as he prefers to put it, the entire subsequent rate of growth in capacity. At one extreme, this rate is never more than 2% per annum for those earning less than $\$_{65}$ 5000 at age 30, and averages near zero percent over a working lifespan of thirty five years*; at the other it is as high as 8% per annum for those earning upwards of $\$_{65}$ 55,000 at age 35 and may average 5% or more over the span of the next thirty years.

Fig 8. shows the array of growth curves Jaques constructed by simply drawing smooth curves by eye at regular intervals through masses of earnings progressions obtained from 21 countries, including the U.S. and Canada. The slanted line labeled "Trial Progression" represents the age zone where the often steep and erratic ascent of many earnings progressions typical of early careers allegedly yields to the stabilized progress of middle and late working careers. The method used to derive the capacity growth curves is rather crude and has been widely criticized. Nevertheless, the much more refined and defensible treatment applied to progressions and other earnings data collected in the Netherlands by Wijnberg (op. cit.) supports the Jaquesian hypothesis.

On the other hand the outcomes of our own rigorous tests on the available data base are at best ambiguous. Because they are not yet concluded, we are compelled to suspend judgment.

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* This implies that whatever wage increases are secured just barely make up for the inflationary rise in the overall wage and salary level.

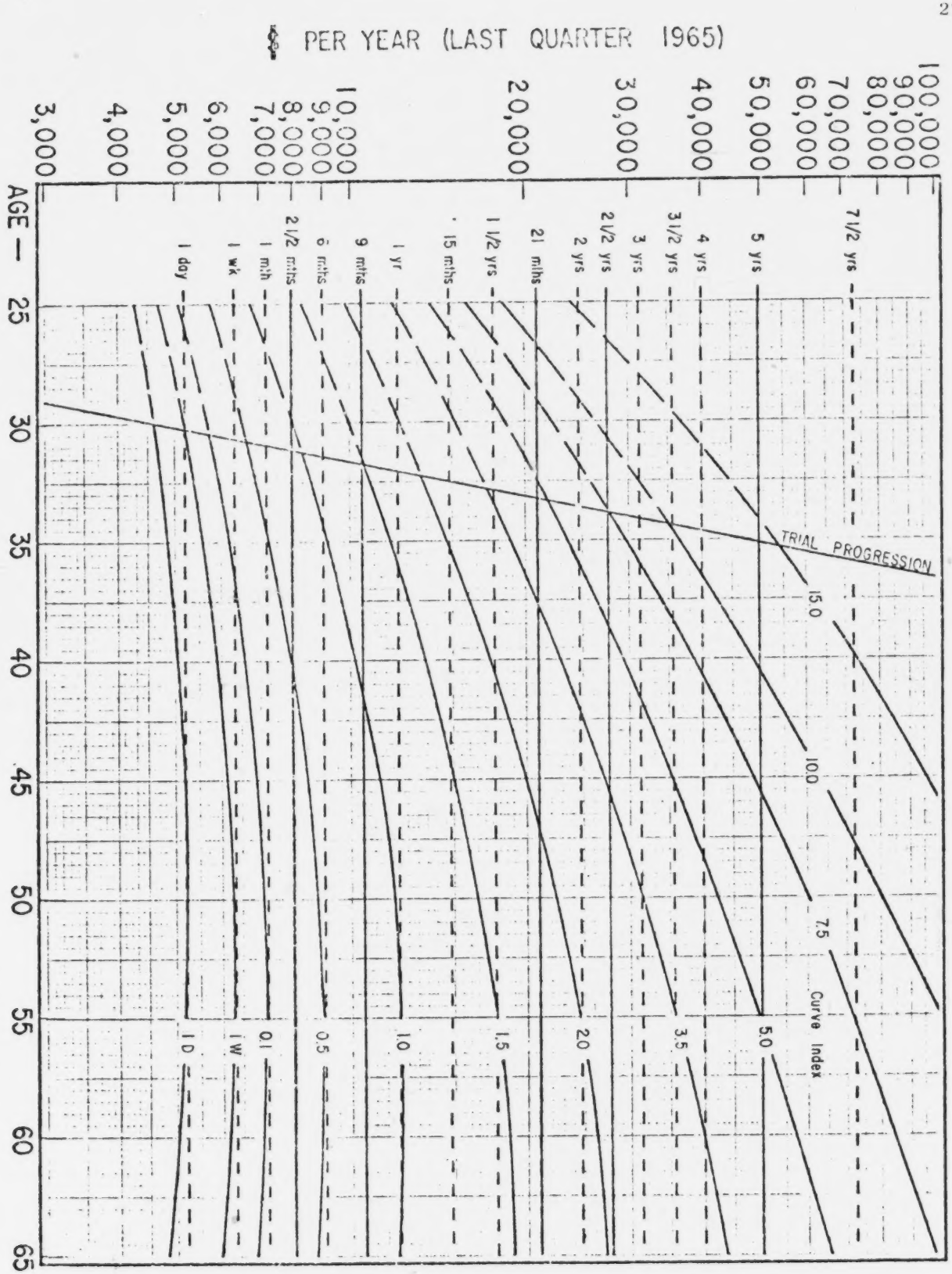

PER YEAR (LAST QUARTER 1965)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
AGE —
25
30
35
40
45
50
55
60
65
7 1/2 yrs
5 yrs
4 yrs
3 1/2 yrs
3 yrs
2 1/2 yrs
2 yrs
21 mths
1 1/2 yrs
15 mths
1 yr
9 mths
6 mths
2 1/2 mths
1 mth
1 wk
1 day
TRIAL PROGRESSION
15.0
10.0
7.5
5.0
3.5
2.0
1.5
1.0
0.5
0.1
1 W
1 D
Curve Index

Fig. 8

3. SOME APPLICATIONS OF THE EARNINGS PROGRESSION TECHNIQUE

3.1 A Profile for Managerial Manpower Planning

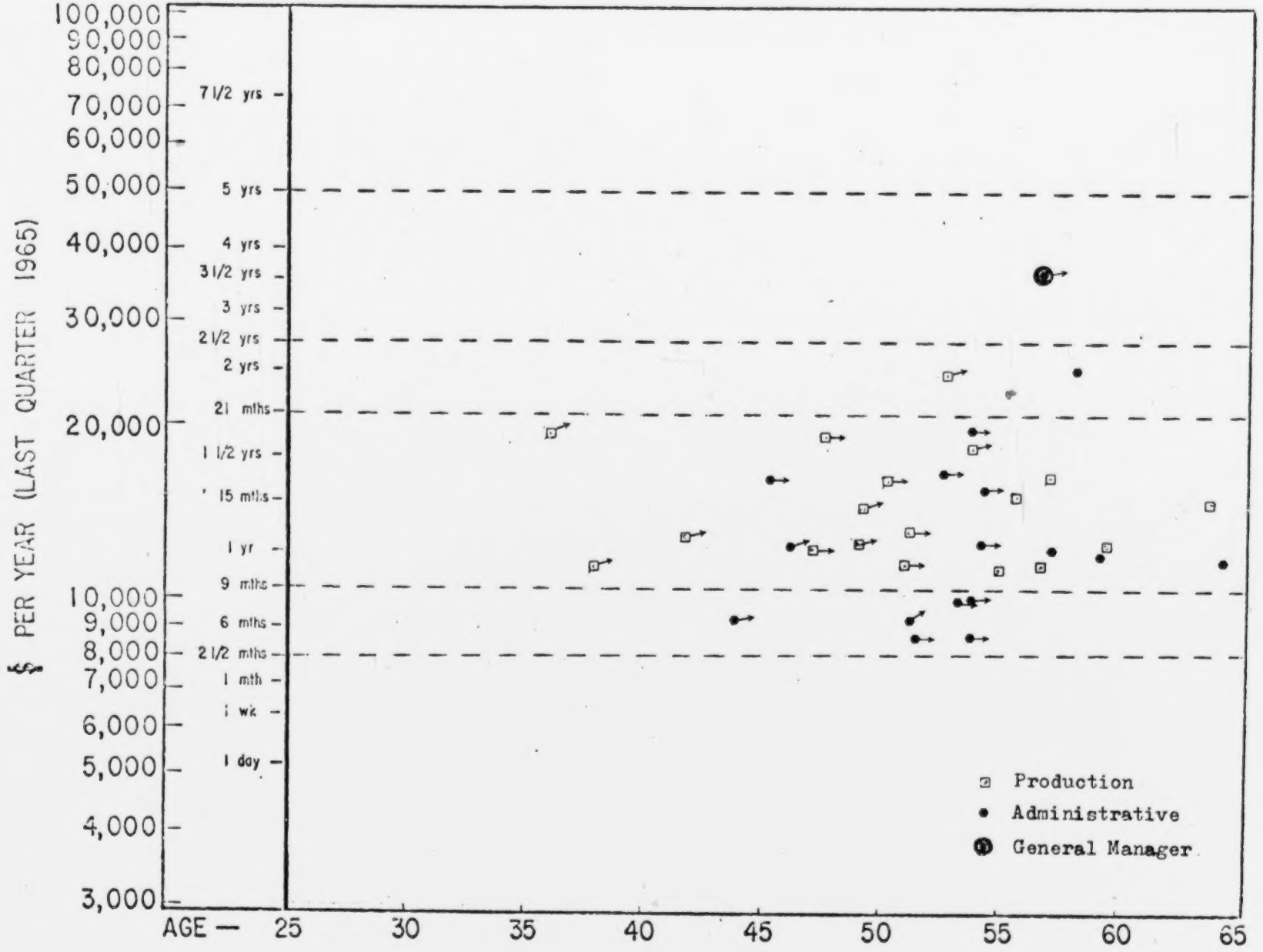
By general agreement, one of the key factors determining the success or failure of a business enterprise is the quality of its management; and the same is true of institutions not aiming for profits, though the criteria of success and failure are more vaguely defined. It would therefore seem that one of the main concerns in any organization would be how to maintain the quality of its management. On this score, however, the prevalent climate of opinion is that there is no way of deliberately ensuring this quality; it is partly a matter of luck and partly a matter of intuitive selectivity on the part of a governing board and the chief executive. Few people seem to feel that such functions as management planning or personnel have very much to contribute in this respect, and hence that it would be reasonable to hold them strictly accountable.

Yet this situation is not immutable. Over the first two years we have accumulated evidence sufficient to show that by extending the techniques described, a foundation can be created for a systematic approach to the problems of management succession, as well as many other practices in the staff planning and personnel areas. Part of its merit lies in its capability to represent visually the present status of an organization and projections of this status as far ahead as ten years or more.

One of the media suitable for this purpose is a chart identical in format with that used in Fig. 7 to plot the corrected earnings progressions of two employees A and B, or the format shown in Fig. 8. If instead of tracing the entire progressions of individuals over time we enter only their present earnings on the chart, it can be made to portray a current cross-cut of an organization or of some segment of it. Depending on the focus of interest, separate charts can be constructed for individual departments, for combinations of several departments, for personnel subgroups having the same or similar qualifications (e.g. engineering, administrative, production, sales, finance, legal), and so on.

The charts pack a large amount of information into a single display (see Fig. 9). Due to the scale on the ordinate and the two parallel scales on the abscissa, it defines the current location of each individual in terms of three variables relevant to staff and management planning: his age, his (corrected) earnings and his level of responsibility. It hence becomes possible to read off the chart what is the present "age balance" and at what levels an organization is facing critical shortages or has built up surplusses. A further informational dimension can be added by drawing in horizontal lines to show the brackets for successive levels of management. By following the "funnels" leading up to each position (there may be several), it is possible to ascertain if there are potential successors in the pipeline, how many of them, and what time lapse separates each from the lower limit of the bracket(s) above his own.

Sight of the charts, if they present their own organization or part of it, is apt to draw managers into discussions of the impact of personnel policies, past and present. An aspect that is quickly appreciated is that sins of omission and commission in this area have long-term consequences in


$ PER YEAR (LAST QUARTER 1965)
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15 mths
1 yr
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1 mth
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AGE —
25
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55
60
65
Production
Administrative
General Manager

Fig. 9

relation to the organization's capability to perform its mission, and further that past policies impose constraints which cannot be removed overnight. This is coupled with the realization that policies and decisions in this area made in the absence of systematic planning entail hidden and avoidable costs. Some of the heaviest of these costs are incurred through emergency recruitment campaigns and through operational disturbances aggravated by loss of customer or client goodwill.

Updating and analysis of the charts and the continuous monitoring of the personnel status it enables, can act as a support for rational personnel policies in several ways. Through encouraging the development of practices for surveying and appraising the potential of the talent available within an organization's lower echelons, it acts as an incentive to the accelerated advancement of the most promising of this talent into positions affording opportunities for learning to exercise expanded responsibilities. We already have strong indications that many firms and institutions needlessly waste and thereby deprive themselves of the managerial capabilities of younger personnel with purely technical and engineering qualifications and experience when denied such opportunities. Even if it turns out to be necessary to supplement the training of these younger engineers and technicians by company-financed attendance of business and administrative courses in educational establishments, the costs would still more than offset the expense of outside recruitment. Our data suggest that the age range 30-40 is critical for transitions from technical to broader executive and administrative assignments.

A feature that has not so far been referred to are the arrows attached to each point on the chart. These are derived from analyses of individual earnings progressions serving as an individual backup to the portrayal of the overall personnel status discussed in this section, and show the dominant trend of each earnings progression. Their inclusion further emphasizes the dynamic character of the chart, but discrimination is called for in interpreting their significance. When the arrow is flat, as is frequently the case, or in the rarer cases when it slopes downward, the temptation is to exclude the employee in question from consideration for advancement to higher position. To do so, however, disregards the possibility that the corresponding earnings progression may fail to accurately represent growth in capability, or that this growth has been affected by extraneous factors outside the individual's control. Lack of opportunity for exercising responsibility or a deficiency in qualifications mentioned in a previous paragraph is one such factor. Internally generated barriers to promotion are another. Temporary difficulties created by family or health circumstances are yet another.

If the aim of an organization is to preserve rather than squander its accumulated human capital, and to optimize its utilization, it is counterproductive to view a flat or downward pointing arrow simply as a manifestation of the "Peter principle": i.e. an indication that the individual concerned has reached his "level of incompetence" and can therefore safely be written off. In our experience that assumption has proved to be unwarranted for most managers before age 55, and for those in the top or corporate management layers before ages 60-65. By far the most frequent factor is neglect of potential and this in turn often points to defects in, or even the absence of, coherent evaluation, promotion and other personnel policies. Because of their ability to display simultaneously a wealth of relationships, the charts we have described are apt to bring such shortcomings in an organization's manpower and personnel policies into embarrassing prominence.

3.2 Forestalling the Loss of Key Managers

Suspensions in individual progress suggested by the directional arrows are thus to be regarded as warning signals, and their discovery followed by more intensive investigations guided by individual earnings progressions of the kind shown in Fig. 7. Aside from providing relevant information themselves, they also direct attention to significant areas. For example, by specifying the point in time where a deflection from the previously dominant long term trend started and showing for how long it has been continued they define the sectors of the career that requires retrospective re-evaluation*.

In general, it is advisable to adhere to the rule that a developing gap between the extrapolated dominant trend and the actual earnings progression signals a potential employee-initiated separation. It is self-evident that the steeper the dominant trend the larger the angle that the gap subtends. and therefore the shorter the time before the individual concerned will become aware of his lagging progress, and start looking for ways and means of getting himself back on course. Add to this that individuals with a steep dominant trend - the "fast risers" - are ipso facto also resourceful and persistent enough to be undeterred by even a tight labor market, and the conditions clearly exist for a shift to another organization, offering more responsibility, often assumed to be reflected in the offer of a higher salary.

One of the first cases we ever came across involved precisely such a situation, and we have since met with it several times over. At our request, we were supplied with the earnings data of two employees both of whom were shown by our plot to have reached positions in the higher levels of operational management, each after some 15 years of steady advancement (Fig. 10). Whether their roles in the organization were in any way functionally related we did not know; in fact, we plotted their progress initially on separate charts. Only later did it turn out that one of the managers concerned was in direct line of succession to the other.

As can be seen from Fig. 10, the last portions of both progressions had flattened out and had remained level over a five and a half year period for the senior man, and over a three and a half year period for the other. At the end points, the size of the gap for the upper plot, in terms of dollars, was $65 11,500, the cumulative loss to the manager in question being in the region of $65 34,000 over the last five years of service recorded. For the younger man, the gap had opened to a final value of $2500, entailing a cumulative loss of some $65 5000 over the last three years of service.

We presented the charts and ventured the prediction that both managers would probably leave the organization unless their responsibilities - and their entitlements - were brought into line with our estimated capacity growth trend. We also invited the organization to inquire if, in fact, either or both managers were putting out feelers in the job market. It was then that we learned that both managers had resigned some time ago and that their resignations had been completely unexpected. To make matters worse, the younger man had resigned ahead of the manager he had been picked ultimately to succeeed. Although it was known that the senior man had reached the ceiling for his role five years prior to his separation, and further that there was no likelihood of a higher position opening up in the appreciable

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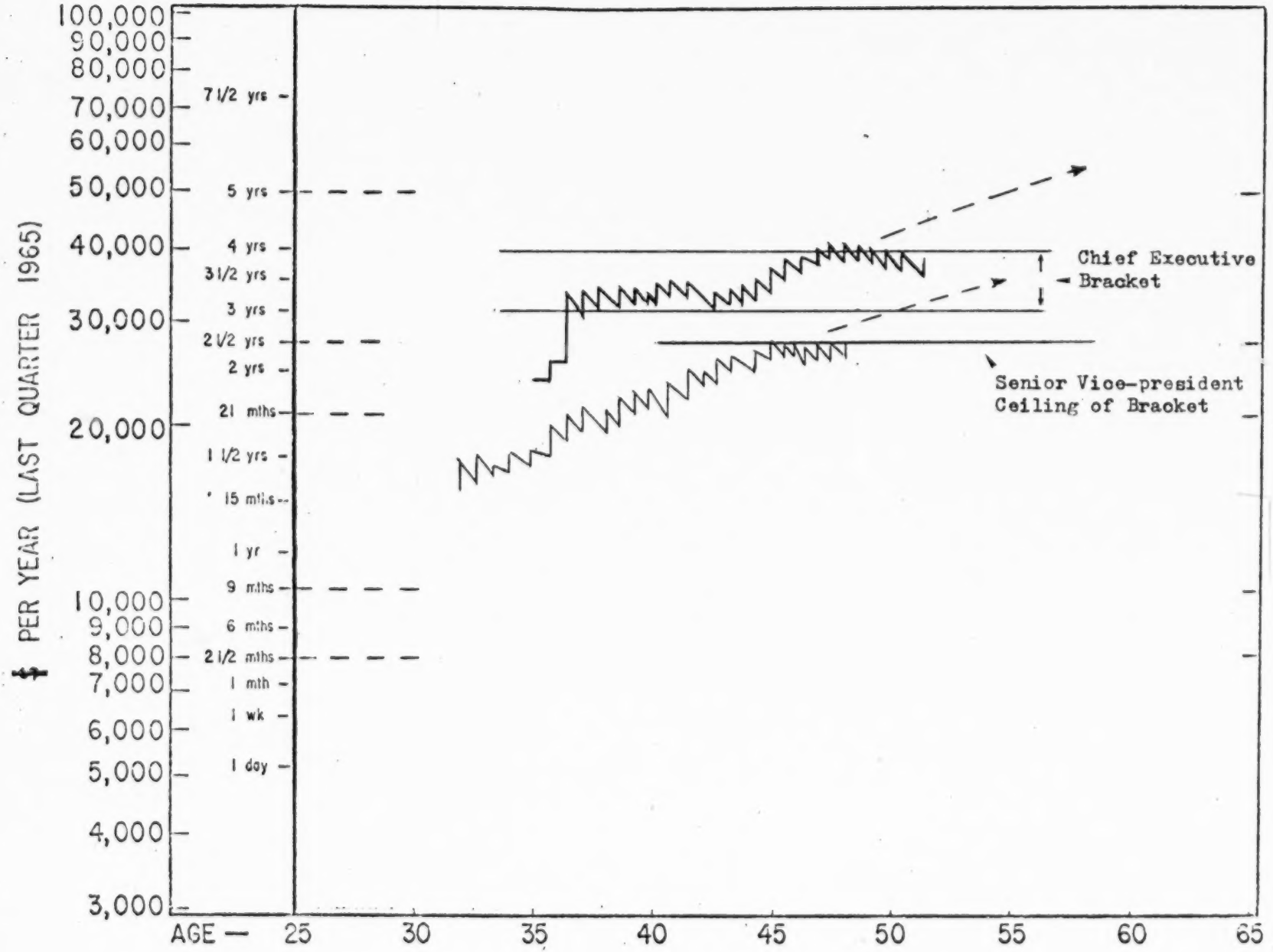
* Once again it must be stressed that such critical effects are masked by salary inflation and only show up when progressions are corrected for inflation.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Chief Executive Bracket
Senior Vice-president Ceiling of Bracket

Fig. 10

future into which he could be promoted, it was considered that the rises unfailingly given him would cause him to stay. For the younger man, it was decided, the prospect of promotion into the higher position, together with regular rises, would be sufficient incentives for him to wait. What remained unnoticed was that even the apparently sizeable rises awarded each did no more than offset the effects of inflation. To be sure, this fact had evidently not escaped the incumbents themselves.

Since organizations suffer most harm when hit by sudden unexpected resignations of occupants in key positions and their presumptive successors, cases like the one just described are liable to be the first to come under scrutiny. The ability of the technique to help organizations retain key personnel by providing early danger signals is sufficient to make its adoption worthwhile. However, the consequences of losing key personnel may be less disabling for an organization than the more covert and intangible effects of failures to attend to the growth potential of employees in less exposed positions. Employees at lower levels of the executive hierarchy may not react by voluntary separation to developing gaps between their capacity growth and the responsibility given them or the entitlements paid, especially at times when jobs are hard to find. But leaving the organization that ignores their personal development is not their only option. If there is no way of obtaining responsibility - and pay - commensurate with one's capacity, performance may be spontaneously reduced or restricted. A concomitant of artificially lowered performance is often an impairment in morale, which has a habit of spreading particularly where there are others similarly afflicted.

The earnings progression techniques are thus most effective when used as part of a coherent staffing and manpower policy which is not only consciously maintained but is perceived to be in effect by everybody in the organization. In practical terms this means that, in rotation, everybody's progress and growth, and not only momentary high or low tides in performance, are surveyed and their future course estimated.

From the manpower planning point of view, the projections into the future are of particular significance. On the assumption that no additions are made to the existing personnel establishment and only attrition is allowed to operate, they bring out very clearly both the surplusses and deficiencies which will arise in an organization's staffing patterns in successive time-periods up to 10 years. A basis is thereby laid for policy decisions calculated to counteract anticipated shortages of some classes of personnel through timely recruitment. Likewise, plans can be laid to assist surplus talent in finding positions in line with capacity growth in other organizations. The fact that individual development of each employee is explicitly taken into account in this policy approach is bound to have additional favorable effects throughout an organization.

3.3 Problems of Management Succession in New Perspective

In retrospect, the most damaging aspect of the case described in the preceding section was the uncertainty that was allowed to persist concerning the appointment of a successor for the senior manager once he retired. Since for some time past there had evidently been no doubt who the successor was going to be, it is hard to see any reason why this decision was not brought out into the open. Except perhaps that it was arrived at by a vague consensus rather than by a deliberate consideration of the whys and wherefores.

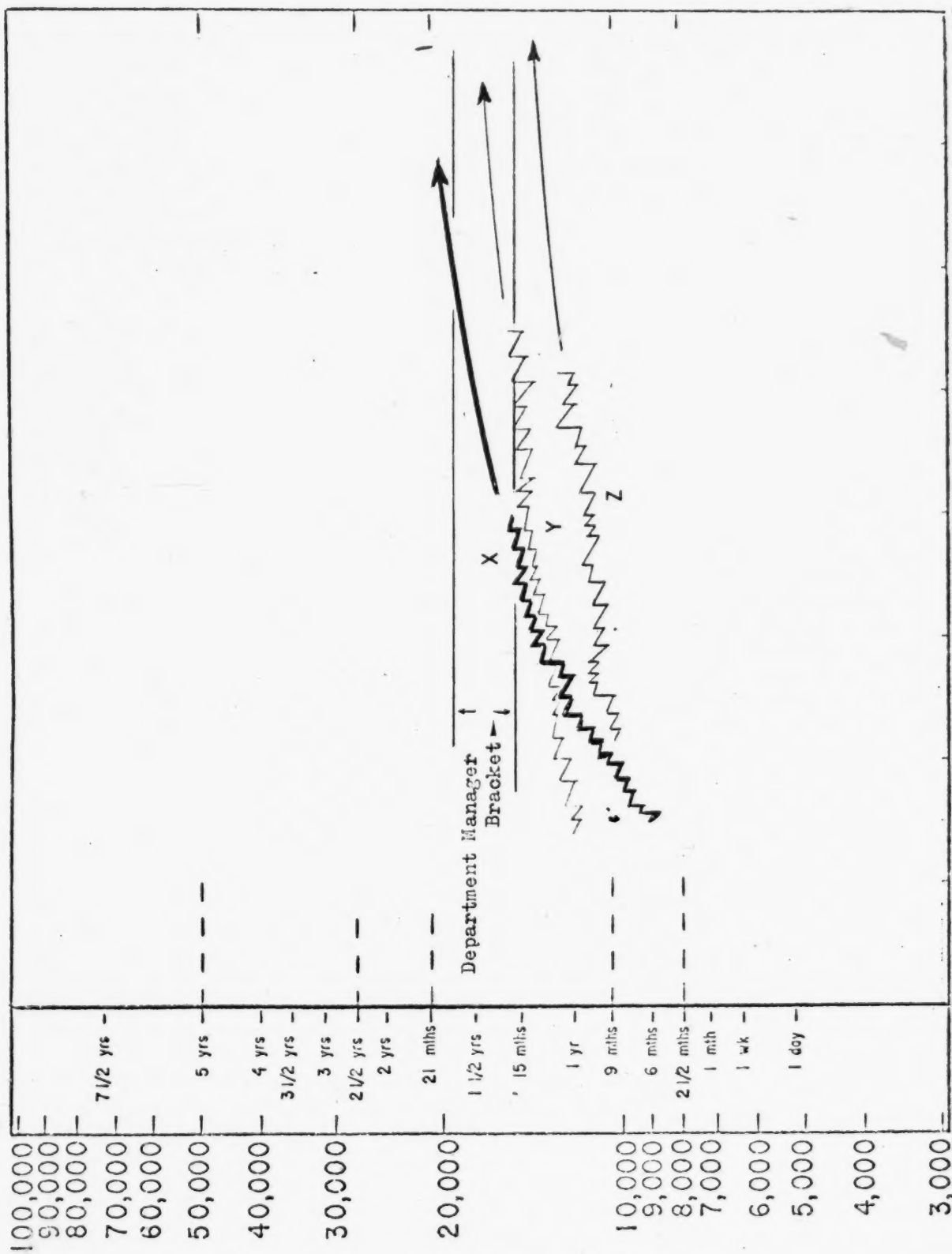
As will now be demonstrated, the earnings progression technique is capable of bringing together many of the facts relevant to rational decisions about management succession. The case, again a real life one, concerned the choice of a replacement for a Department Manager who at age 64 was not far off retirement. At age 54 he had been ready for promotion which never occured, and by the time he recognized the gap between his capacity and the responsibility given him, he considered himself too old for a move and decided to stay on.

The level of responsibility (and pay) bracket for the position of Department Manager is shown by the two horizontal lines in Fig. 11. All three candidates, X, Y and Z aspiring to his position were already in the firm's employ and possessed the requisite technical qualifications. From the plots of their respective earnings progressions it became evident that Z could be excluded: his capacity for carrying responsibility was not then, nor would it ever be, sufficient to meet the minimum requirements of the higher position. This left X and Y, both of whom already had, or were close to having, the capacity to assume the position, and at first sight it therefore seemed a moot point which of them would be a better choice.

Estimations of their prospective growth in capacity, based on extrapolations from their earnings progressions, however, suggested substantially different outlooks if either of the two came to occupy the Department Manager position. Thus Y, the senior candidate, whose age at the time was not far off 55, had progressed steadily along a rather flat progression. If selected, he could be expected to perform competently, and to tend to adhere to the operating procedures set up by his predecessor, introducing few changes. Also, he would not outgrow the position before retirement. The steeper slope of X's progression and his lower age if promoted foreshadow more radical changes in the conduct of the Department and a more dynamic handling of its problems. Moreover, after a tenure of 10 years or less, X's capacity could be expected to have outgrown the responsibility requirements of the Department Manager position. Thereafter the question of finding a successor would again appear on the agenda.

Which candidate was finally chosen is of subsidiary interest. Suffice it to say that, common practice to the contrary, any selection made with reference to the candidates' attributes alone could not be described as a rational one. A rational decision can only be arrived at by assessing the implication of either choice for the rest of the organization and by taking account of its goals and objectives. A whole study of "what if" questions is raised which need to be at least considered if not resolved. For example:

What if the senior candidate is appointed? There is evidence he will essentially continue along the lines of his predecessor: is this acceptable in the light of the organization's prospects and plans? Are changes in these prospects and plans likely to occur within the ten years over which he must be assumed to remain in the position? If the prospects changed radically after, say, 5 years and a new style of management were needed, what inducements would be necessary to effect his early retirement? Can a replacement for the position made vacant by his promotion be found immediately and from within the organization or will an outsider have to be recruited? What are the likely reactions and X and Z, particularly the former? Are there suitable replacements if he decides to quit? And so on.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1 day
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Department Manager Bracket
X
Y
Z

Fig. 11

Promotion of X rather than Y is bound to create other contingencies which can only be resolved in the light of the organization's general policies and the availability of resources for dealing with these contingencies.

For practical purposes, the usefulness of the graphical representation shown in Fig. 11 is limited to comparatively small organizations or organizational units, where the plots for individual candidates are few in number and therefore easy to keep apart. Even then, the extrapolations have to be made by eye and are thus liable to be faulty. In larger organizations, divided into units that are geographically dispersed and enjoy varying degrees of autonomy, there will likely be many potential candidates for a given position, and oversights or inaccuracies in plotting or extrapolation may have more serious consequences, immediately and in the longer term.

Because of the vital bearing they have both on the organization's future effectiveness and the progress and prospects of employees, the raw data supplemented by other relevant information needs to be pre-processed and ordered, before being submitted to decision makers. With data generated in the operations, financial and other spheres this is common practice; standard methods have also been developed for presenting this kind of management information. Not so in the personnel area.

One possible method of drawing together earnings history data, combining them with ancillary information, and formating the results of analyses on earnings progression plots, has been devised by us for a large manufacturing corporation. At our request the Director of Organization Planning singled out six positions, including a newly created one, expected to fall vacant over a period of five years ahead. Each position was defined for us in terms of its salary bracket that had recently been reviewed and adjusted*. For some of these positions, the corporation picked as many as three nominees regarded as the prime candidates for succession. In order to test the power of the earnings progression technique alone, only the past earnings record for each of the nominees was supplied, covering their occupancy in all positions previously held within the corporation and before joining it.

In reporting the conclusions drawn from the analysis to the corporation, we decided to withhold the actual plots as adding little to the presentation. The report consisted of an introductory part, wherein we listed the kinds of questions that need to be considered in the process of evaluating the suitability of candidates for each position. These questions were raised again, and in a more specific form, in the next part of the report. Here the chief responsibility requirements were described of each of the six positions due to open up within the next five years, followed by brief characterizations of the nominees, their relative claims, and the length and nature of their tenure if selected for promotion. Finally some of the problems elsewhere in the organization likely to result from the choice of one or the other of the nominees were outlined. A version of the section concerned with the comparative evaluation of three candidates for the position of Senior Vice-President and Chief Financial Officer is included in Appendix A to this report.

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* It would have been preferable to measure the levels of responsibility for each position and to derive the corresponding salary brackets through the LR/EP function. Under the given circumstances this was not possible and hence we had to reverse the procedure and obtain Level of Responsibility estimates from the salary brackets.

Table 3 gives a summary of the results of all the analysis in the report, the entries having been changed to disguise the identity of the corporation, the positions to be filled and the nominees. An aspect of the summary calling for special comment concerns the entries in columns 3 (Potential for Near...) and 4 (When Ready to Assume...). With one exception, the leading contenders for each of the positions are stated as needing from two to five years' additional experience in their present positions. This should not be taken to mean that their premature advancement would entail excessive risks, much less that they should be excluded from consideration. Taking a chance on an early promotion for MR, and even for TW and LF (the latter to Manager, Labor Relations) would in most organizations be thought greatly preferable to the costs, uncertainties and aggravations connected with bringing in outsiders. Apart from promoting a manager over the head of another, nothing causes as much disturbance. Often this disturbance continues to reverberate throughout an organization for months and years.

Conversely, the summary in Table 3 also points up the instances where the odds are against the advancement of available managers into higher positions. For example, the leading contenders for Vice-President, Operations, and for Manager, Industrial Relations, do not appear to be ready to assume these positions for many years ahead. Not only does this kind of evidence supply the objective backing for external recruitment, but it is also apt to remove the nagging doubts which often attend an action bound to be considered unnecessary by some and unjustified or plain unjust by others.

3.4 Applications in Outside Recruitment

One feature of the earnings progression technique that never failed to be mentioned while we explored its uses in various organizations was its potential as a method of selection, or at least as a complement to the established selection procedures. We were, ourselves, aware of this potential, but since our interest was centered more on problems of organizational design, we were not particularly keen to become involved in a field that has been thoroughly worked over for many years.

This attitude, however, underwent a revision when the first trial application had quite an unexpected outcome. The organization that instigated the trial had already gone through the preliminaries of the recruitment drive. All the tests and interviewing had been completed and the choice for the advertised position made.

The results of the progression analysis, carried out in ignorance of which applicant had been picked for appointment, were completely at variance with this choice. Still more to the point, the selection board found the reasoning back of the analysis convincing enough to reverse its decision.

As can be seen in Fig. 12, the position for which the organization invited applications from outside straddles the boundary between what we have previously defined as the middle and upper operating management levels. Its salary range, represented by the two solid horizontal lins across the chart, was set at $\$_{65}$ 19,100 - $\$_{65}$ 23,700. The range of the target position overlapped with that of the superordinate position represented by the broken

Table 3

Position to be Filled and Required Discretionary Time-Span (Months)	Candidates	Potential for Near Term Incumbency in Position to be Filled	When Ready to Assume Duties of New Position	Maximum Duration of Balanced Tenure (1	
				in New Position after Promotion	in Present Position if not Promoted
Senior Vice-President and Chief Financial Officer (48-72)	TW	Yes	in 4-5 years	8 years	1-2 years
	RD	No	in 12 years	to retirement	5-6 years
	GP	No	at no time	--	7-9 years
General Manager, MC Division (34-54)	HN	Yes	immediately	11-12 years	2-3 years
	DF	Yes	in 4-5 years	to retirement	7-8 years
Vice-President, Sales and Marketing (24-45)	MR	Yes	in 2 years	to retirement	5-6 years
	JT	No	in 9 years	to retirement	less than 1 year
Vice-President, Operations (22-39)	SN	No	in 9 years	to retirement	12 years
	GL	No	at no time	--	to retirement
Manager, Industrial Relations (16-23)	LF	No	in 13-15 years	to retirement	2-3 years
		Yes	in 4-5 years	to retirement	

(1) Tenure past this point will result in undercompensation and could soon after result in the employee's departure from the firm.

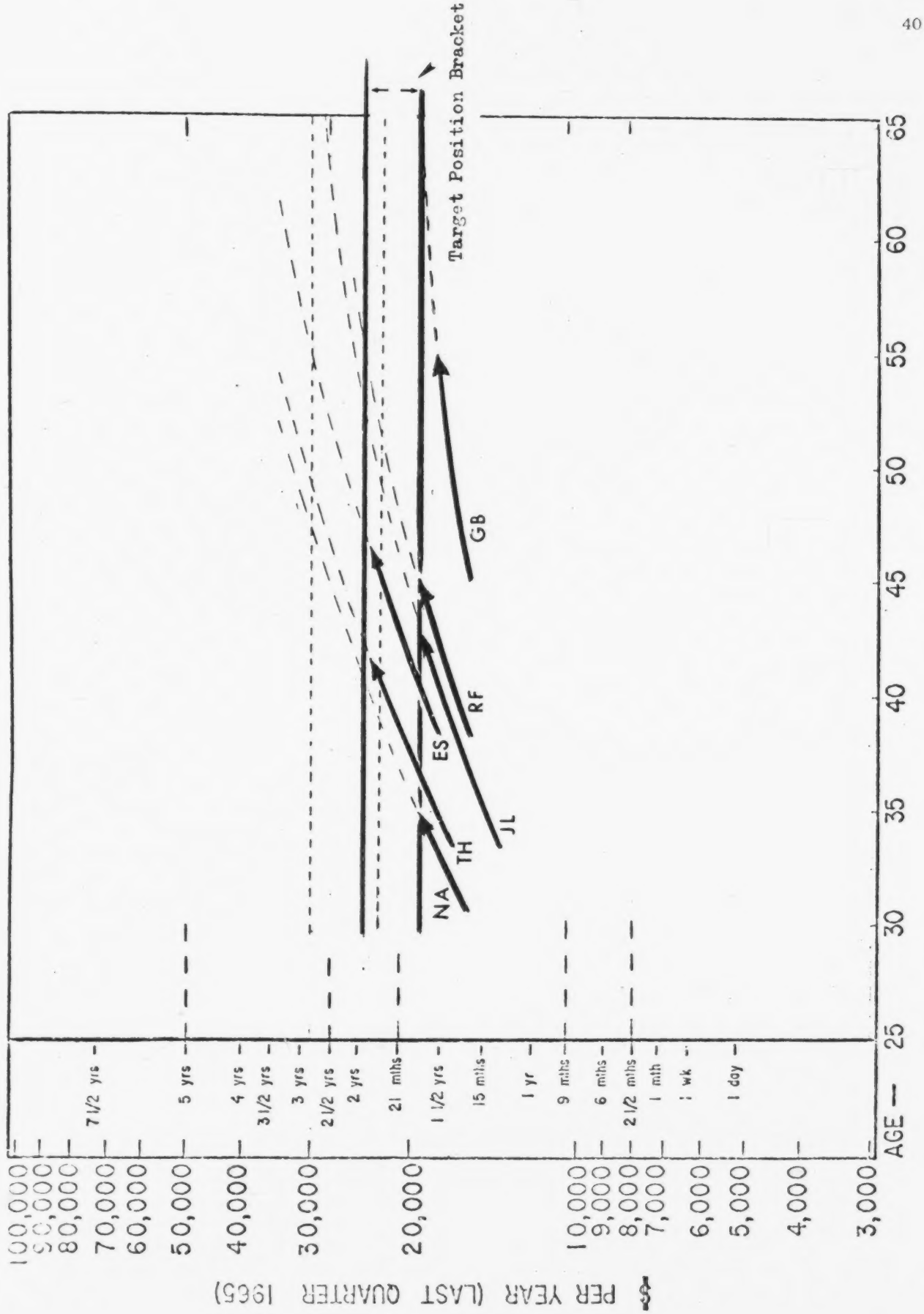
horizontal lines. The past earnings progressions of the six applicants (including one from inside the organization) who survived the prescreening are shown by smoothed plots terminating in arrows. Their recoded initials are attached to each plot and their ages at the time of selection are denoted by the points of the arrows. Trend extrapolation for the progressions are shown by the broken lines continuing past the arrow points.

Straightway, candidates TH and ES were set aside. The arrow points of their otherwise very regular plots end quite close to the upper limit of the salary/responsibility range for the target position. Due to the overlap in ranges, they are in fact already into the range of the position one higher. Hence it could be inferred that, after a brief honeymoon period, they would (and should) be asking for promotion and, since this was barred, leave the organization again. This would necessitate a new recruitment drive. From among the remaining candidates, GB, the inside candidate, was the next to be eliminated. His plot suggests that he has insufficient capacity to occupy the vacant position and that expected performance would barely meet minimum standards if he were promoted.

Examination of RF's plot showed large ups and downs in his past progression. Inquiries to track these down to their sources indicated some very real and recurring personal problems, warranting exclusion of RF's candidacy. This left NA, at 35 the youngest applicant, and JL, aged 43, still in the running. Both of them clearly had the requisite capacity, as well as the growth potential for which the target position offered the right amount of scope. It would keep the more dynamic NA adequately stretched, while making headway, for some 6 years; an approximately 10 year tenure is indicated for JL. Thereafter they would again be fit for further promotion. To take the analysis beyond this point we would have had to know much more than we did about the organization's outlook and plans for the future, and we said so in our report.

We learned about the selection board's original choice only after one of the two candidates put forward by us had been offered the job. The man the board had nominated before receiving our recommendation was ES with GB as runner-up, following TH's withdrawal of his application. This withdrawal must have been welcomed with some relief, since TH had very likely emerged as equally well qualified as ES, and it would have been difficult to decide between them. In any event there was no disagreement about both these candidates being way ahead of the rest of the field. Reference to Fig. 12 shows a complete convergence between the plots for the candidates and the determinations arrived at through the organization's selection procedures. In either case, ES and TH come out on top, and this constitutes some evidence for the validity of both approaches.

For an explanation of the conflict between the recommendations regarding appointment, one has to look not to the selection methods used so much as to the criteria applied. It is here that, in our estimate, the earnings progression technique has most to contribute. Where the selection board had seized on ES and TH as being the best candidates, we had excluded them in our analysis at the start because they clearly seemed overqualified for the target position. By accepting, they would automatically have created a situation of disequilibrium between their capacity and the responsibility and pay associated with the position. TH had evidently perceived this and his withdrawal was thus hardly accidental. ES had expressed willingness to take the post albeit not at the minimum salary offered. Though this placed him at a level below


Target Position Bracket
NA
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PER YEAR (LAST QUARTER 1965)
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Fig. 12

his capacity and even below his previous entitlements, he gave assurances that he would not seek advancement beyond the ceiling of the position. The objective of the recruitment effort seemed thereby to have been accomplished: the organization had found the best candidate at the least outlay in terms of pay.

That these were the determining selection criteria was further supported by the inclusion of GB in the final stages of the selection process, as the most likely candidate to be appointed had ES joined TH in turning down the position. Of the remaining four candidates, GB included, none had capacity in excess of the minimum salary offered. Had the effort failed to secure a manager paid at a lower rate than his capacity warranted, GB would have been the perfect holdover candidate in the board's view. At 55 he was the oldest of the four applicants, his capacity was about on a par with theirs (see Fig. 12) and, since he was the only "insider", the board could count on his appointment being widely approved.

If this is not evidence enough of the questionable policy to find a bargain instead of a candidate who fits longer range requirements - a policy implicitly followed by organizations with few exceptions - the entire conduct of recruitment campaigns supplies further corroboration. It accounts for the ambition to net as many applications as possible, an end best served by keeping the wording of the advertisements vague*. A large yield of responses clearly increases the chances of catching a few applicants willing to sell their services for less than they are worth. The costs to the organization in the man-hours spent processing a large spate of applications is evidently not counted, much less the costs to the applicants in wasted time and effort and sometimes earnings lost. Nor does it seem to be taken into account that the overqualified and underpaid appointee soon discovers that he has been shortchanged and has many ways of taking his anger and frustration out on the employing organization. This may include sudden resignation with all the potential damage it can cause.

At the next step, the procedures are equally wasteful. Psychological testing services may be hired, highly paid executives directed to set time aside for extended interviews, and repeated meetings called, in a single-minded effort to find the best applicant - best in the absolute sense, not best for the position advertised - and persuade him into acceptance at the lowest negotiable pay. When added to the pre-processing costs, the total expenditure may well exceed the savings made on the appointee's pay for two or more years ahead.

Charts like that in Fig. 12, accompanied by a modicum of explanation, make it easy to point up the drawbacks of recruitment campaigns dominated by irrelevant criteria. Using them in the last, i.e. selection, stage of these campaigns as we did in the above example, is however suboptimal. To exploit their full value they would have to be introduced before the recruitment drive

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* By surveying a large number of positions advertised we found that the prevalent practice is to give the position title in full, state the main duties and qualifications required, gloss over the scope of the responsibilities, and omit the salary and other benefits altogether. Instead, applicants are asked to indicate what remuneration is acceptable to them.

was started, as a means of deriving a specification of the desired occupant. Such a specification would be essentially forward looking in the sense of ensuring conformity both with the organization's requirements and the interests of the occupant who will ultimately occupy the position, not just now, but some way into the future. The output of the advance deliberation would be a curve or an "indifference" funnel plotted acorss the band delineating the upper and lower limits of the salary (plus special benefits) range.

In turn, the specification will provide many of the data necessary to make the announcement of the vacancy precise rather than vague. As is done by some firms already, advertisements would state that "those earning less than $X need not apply", supplemented by the statement that "those earning more than $Y need not apply". This would, at the same time, reduce the volume of applications and the expense of pre-processing, and increase the proportion of suitable candidates within the total sample. A further narrowing down in candidacies would result from matching past earnings histories (which would also be asked for in the advertisement) to the progression shown by the charted specification. This routine operation could be easily performed by clerical personnel in the organization planning department. Only the last survivors of this prcoess would be given psychological tests and their interviewing would be confined to a committee of two, the immediate manager of the position advertised and his own manager.

By discussions in various organizations we have ascertained that the proposed recruitment procedure cannot be faulted on substantive as well as economic grounds. Despite this, the first practical test is not yet in the offing.

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APPENDIX A

Senior Vice-President and Chief Financial Officer

With a salary range from $58,800 - $88,100 and a corresponding responsibility range of from 4 to 6 years (in time-span units), this position calls for a level of capacity uncommon in candidates under 40 and still rare in candidates above this age. Fortunately, the present incumbent is expected to remain in the position for at least another five years. This is important since none of the three nominated aspirants is fit for promotion into the position before that time. Even then only one of them - T.W. (present position: V.P., Corporate Growth) - can be regarded as a serious replacement. In about 4 - 5 years, T.W. will have attained the capacity to hold down the position at the minimal required level. Thereafter, the width of the responsibility/pay bracket for the position is sufficient to permit a balanced growth of this candidate for some 8 years, ensuring satisfactory occupancy well beyond 1980.

The other two nominees for the target position, R.S. (at present V.P. and Controller, aged 41) and G.P. (at present Treasurer, aged 38) are both subordinates of the incumbent Senior V.P. and Chief Financial Officer, and may for this reason not be wholly unaware of their candidature. R.D. is shown by our analysis to have progressed steadily along a well-defined capacity growth curve for his first three years with the firm. His promotion to Controller and Assistant Treasurer in 1967 shifted him to a steeper-slope curve and his subsequent advancement has been extremely rapid. But, even assuming his more recent trend accurately reflects his growth, he will not have reached the minimum boundary for the target position earlier than in 11 - 12 years (seven years later than T.W.) whereas he will have outgrown his present position after only 5 - 6 years.

G.P. has been with the firm for only two years and, unfortunately, the data on his earlier history is incomplete. Even so it is fairly evident that his capacity will never be adequate for the target position. However, he will outgrow the Treasurer position in 7 - 9 years and, by all appearances, will be ready to take over as V.P. and Controller in 4 - 5 years, about the same time R.D. will have outgrown it (see above). G.P. might also conceivably be considered for the Vice-Presidency Corporate Growth in 4 - 5 years, but not without a re-evaluation of his potential, say in 3 - 4 years, when additional data from that period of time will permit more definite conclusions.

T.W.'s promotion to the target position in 4 - 5 years being assumed, the company will then face these problems:

(a) Filling T.W.'s vacated position of V.P., Corporate Growth. If this position continues to call for a relatively young, dynamic occupant such as T.W., both R.D. and G.P. will be disqualified. In addition, for R.D. the Vice-Presidency, Corporate Growth, would not constitute an advance on his present position.

(b) Deciding whether to groom G.P. for the position of V.P. and Controller or for T.W.'s position of V.P. Corporate Growth.

(c) Finding or creating an acceptable position for R.D. after he outgrows his present post in 5 - 6 years.

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